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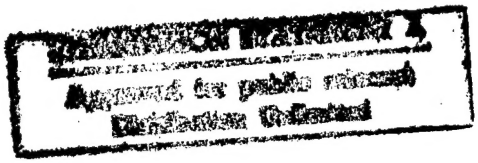

China Report

AGRICULTURE

No. 233

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CHINA REPORT

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PEOPLE'S REPUBLIC OF CHINA

ABSTRACTS

I. GENERAL INFORMATION

CALL FOR ECONOMIC EFFICIENCY IN ENTERPRISE CONSOLIDATION

Beijing ZHONGGUO NONGKEN [STATE FARMS AND LAND RECLAMATION IN CHINA] in Chinese No 7, 1982 pp 2-3

[Commentary: "Special Commentary on Improving Economic Efficiency in Enterprise Consolidation"]

[Text] Early this year, the party Central Committee and the State Council passed a resolution to carry out an overall consolidation of industrial enterprises. Premier Zhao Ziyang made a speech to the All-China Industry and Communications Conference and placed emphasis on improved economic efficiency as the core of enterprise consolidation. The resolution passed by the party Central Committee and the State Council is perfectly suitable for state farms and land reclamation enterprises. The former Ministry of State Farms and Land Reclamation discussed the issue of consolidating the state farms and land reclamation enterprises at a national conference for the department and bureau chiefs in charge of state farms and land reclamation in March. After the conference, the state farms and land reclamation departments of all provinces, municipalities and autonomous regions issued notices on enterprise consolidation. After the organizational restructuring was generally settled, the General Bureau of the State Farms and Land Reclamation of the Animal Husbandry and Fishery Ministry of Agriculture [newly established], immediately decided that within the next 2 or 3 years the cadres of the organization should be assigned in groups and at different times to participate in the work of enterprise consolidation. This year, four workgroups have been formed and sent to Heilongjiang, Guangdong, Tianjin and Jiangsu reclamation areas to conduct pilot projects and gain experience in enterprise consolidation (including farm, factory and agriculture, industry and commerce combined enterprises).

Since the smashing of the "gang of four," the work of enterprise consolidation in State farms and land reclamation has been carried out several times and has achieved varying degrees of success. From late 1977 to early 1978, the state Council has convened a national state farm work conference and recommended that state farms be consolidated, especially the leading bodies, the staff and workers and the management. At that time, the state farms had serious problems because of the 10 years of chaos. The leadership groups were not skillful, the staff and workers were lax and enterprise management was confusing. After the conference, all levels of state farms and land reclamation departments had carried out, under the leadership of the local party committees and government, a great amount of work in running the state farms, enabling them to gain rapid preliminary progress in production and management. In 1979, China's gross

value of industrial and agricultural output, the total output of major agricultural products and the amount turned over to the state under the state farms and land reclamation system all reached new historic levels. Because the state had raised the purchase price for agricultural products, and implemented a financial payment system [a system of payment partly in kind and partly in cash] and a production responsibility system for the state farms and land reclamation enterprises, the management and administration were thereby improved. As a result, a 10-year history of deficit was ended through the realization of a profit of 520 million yuan this year. Furthermore, despite an increased expenditure of over 600 million yuan in 1980, there still were profits of 650 million yuan. In 1981, the Heilongjiang reclamation area suffered especially heavy flooding and drought with great reductions of production, thereby turning the previous year's profits of over 400 million yuan into a deficit of over 300 million yuan. However, by the arduous struggle and fortitude of the broad staff and workers of the state farms and land reclamation system, China still made a profit of 200 million yuan. The number of provinces that had made profits had increased from 18 in 1980 to 25 in 1981. The Jiangsu state farms and land reclamation system also reached the goal in which every farm and factory made a profit.

Nonetheless, we must clearly understand that the production and management standard in the state farms and land reclamation enterprises still are very low and that there are many obvious deficiencies. For example, there were four provinces, municipalities and autonomous regions which suffered losses in 1981. Thirty percent out of the total number of farms throughout the country still suffered losses, with a gross deficit totaling over 400 million yuan. Also in 1981, China's industry netted a profit of about 500 million yuan, but its agriculture suffered over 300 million yuan in losses. This was especially true of animal husbandry enterprises; with the exception of a small number of provincial and regional farms, the majority of provincial and regional farms suffered losses. In terms of the use effect of capital, the output value realized in each 100 yuan of fixed assets was 105.3 yuan in 1979. It was 95.9 yuan in 1981, a decrease of 9.4 yuan. Also in 1979, the output value realized in each 100 yuan of liquid assets was 168.9 yuan, while it was 147.9 yuan in 1980, a decrease of 21 yuan. In 1979, each 100 yuan of fixed assets realized a profit of 5.1 yuan, while it was 7.3 yuan in 1980. For each 100 yuan of circulating capital there were profits of 8.2 yuan in 1979 and 11.3 yuan in 1980. The rate of profit on capital was 3.2 percent in 1979 and 4.5 percent in 1980. Although the capital efficiency was higher in 1980 than in 1979, overall it was still very low. (For 1981 was plagued by natural disasters, and other nonmeasurable factors, so no statistics are given.)

There are a number of reasons for these conditions. We are in the midst of enterprise consolidation and must make conscientious analysis, seeking truth from the facts, learning from past lessons and experiences, take properly directed actions and improve economic efficiency.

The prerequisite for improving economic efficiency is to improve production levels. Economic efficiency can only be improved through production increases, a greater variety of products and an improved labor productivity. Of course, production must be arranged according to the state plan and to market needs. If there is blind production or disregard of the state plan and market needs,

even though there may be a great variety of goods produced this will create enormous stockpiles and result in less economic efficiency. Therefore, production developments must go hand in hand with improved economic efficiency.

During this readjustment period, in order to raise the standard of productivity in state farms and land reclamation enterprises, we must focus on content as primary and expansion as secondary and thoroughly and resolutely carry out this policy. According to studies of 15 land reclamation areas, in 1981, the 41 million yuan invested for capital construction was not used in accordance with the state plan. Some areas used the fund for capital construction as production cost, some used up that year's profits and self-owned circulating fund, while some used up or overspent the responsibility system cash surplus or the funds allotted for making changes. If such conditions are not corrected and if capital construction continues to grow this will seriously affect, the implementation of the readjustment policy. In agriculture it will affect our ability to concentrate our forces on increasing yield per unit area now under cultivation; in industry there will be adverse effect on tapping potential, innovation and reform in enterprises currently underway. In the process of implementing comprehensive management of agriculture, industry and commerce, it is necessary to actively develop processing industries which utilize farm product as raw materials. However, it is first necessary to make improvements in agriculture. If agriculture is not improved there will be no solid foundation and the processing industries will be like "cooking a meal without rice" and suffering economic deficiency.

In addition to becoming closely involved with improving production in order to lay a solid foundation for improving economic efficiency, it is necessary to improve management. In recent years, we have implemented financial responsibility systems as well as various forms of production responsibility systems. These have been very successful in strengthening economic accounting, but there are still many gaps in our enterprise management work. Recent investigations of financial and accounting records and materials concerning illegal activities in economic affairs show that the problems are quite serious. According to incomplete statistics from 15 land reclamation areas, 120 million yuan was used in violation of financial and accounting rules, with 18.3 percent of indiscriminate use of the capital, 34.2 percent of unscheduled construction, 16.7 percent of concealing production and reporting less profit, and 7.5 percent of embezzlement and theft, speculation and profiteering. There also were feasting and gift-giving, free spending and waste, using public funds for personal gain, taking public property for personal use and abusing the issuance of bonuses and subsidies. Moreover, because of laxness in the system it was generally not possible to assign responsibility to anyone for the loss of money and property or for the waste and abuses. Therefore, all leadership levels must pay attention to these problems, combining investigation of financial and accounting violations with tackling the criminal economic activities, and making it an important part of the enterprise consolidation efforts. During enterprise consolidation, the truth which has been exposed should be used as a lesson to educate the broad staff and workers for the good of the country and the good of our enterprises, protecting state finances and property from damage and loss. The exposé should also be used as a lesson to promote our superior traditions of an arduous struggle against corruption, never

becoming tainted and wage a resolute fight against all activities which violate state financial and economic regulations or damage and misappropriate state funds or property. At the same time, all regulations must be strengthened and rigidly enforced to build the state farms into socialist new enterprises having high levels of both material as well as spiritual civilizations.

According to the demands of the party Central Committee, enterprise consolidation is to be all-encompassing. Consolidation should be done well in "three constructions," namely: gradually construct a democratically centralized leadership system, gradually build rank and file staff and workers that are both "red" and expert, and gradually construct a management system that is both scientific and spiritually civilized in its approach. We should do well to meet the "six demands," namely: correct consideration of the three constructions, superior product quality, high economic efficiency, good labor discipline, quality cultural production and good political work. Our state farms and land reclamation enterprises ought to follow these standards in evaluating each enterprise. If the results do not meet the standards even after consolidation, we must further study so that we do not lower our standards even the slightest.

All levels of state farms and land reclamation departments must classify and prioritize their state farms and land reclamation enterprises under its jurisdiction. For instance, which enterprise should be consolidated first and which enterprise later, making an all-round, comprehensive plan to consolidate step-by-step. This year, there first ought to be consolidation of those "old, big problem" units which have made slow progress in production and management and suffered huge financial losses. Competent work teams should be sent to help the enterprise quickly change conditions. The starting point for consolidation and the techniques to be used for consolidating each enterprise depend on the particular circumstances involved. Some should start with the leadership groups that are engaged in consolidation, some should start with adjustments in management and policy, some should start with strengthening of the production responsibility system, and some should start with consolidation of financial and economic rules and regulations or with an investigation of and an attack upon illegal activities in the economic affairs. In general, the actions should suit the needs rather than to impose arbitrary uniformity. Leadership cadres must personally participate in enterprise consolidation. They must be in the front lines in person and grasp well first-hand information in order to obtain direct experience and promote these consolidating efforts.

The process of enterprise consolidation must strictly adhere to all points of the party plans and policies. Under the leadership of the local party committee and local government there must be complete reliance upon the broad staff and workers to carry out consciencious study and investigations, make complete and realistic analyses of everything and arrive at realistic, and not subjective and partial conclusions, partially avoiding all extremes in their actions.

In consolidation, we should uphold everything that is correct, and correct everything that is wrong. Some issues must be conscientiously studied and researched, made clear of what is correct and incorrect through discussions

with staff and workers and approved by the upper level leadership before they can be strictly carried out. For example, in implementing production responsibility system, a question of how to carry out the principle of distribution according to work must be correctly handled according to the relationship between the interests of the state, the enterprise and the individual. There still is the issue of how to develop an economy based on a collective ownership system while carrying out the principle of exchange for equal value. Another issue would be how to promote the staff's and workers' family sideline occupations with assurance that these sideline occupations will not adversely affect the workers' completing their primary jobs and in turn jeopardizing the state interests.

Enterprise consolidation will also have social bearing as a result of management profit and loss. In order to accurately calculate enterprise management conditions, the various expenses which should not be shouldered by the enterprises should be itemized individually and specifically. Separate calculations should be made so that these expenses are not included in the profits and losses, and certainly not figured in the production costs. Only by taking out from the enterprise expenditure the costs which the enterprise does not bear can we really show the management and administrative levels of the enterprises.

At the same time that all the state farms and land reclamation departments are conducting test work in enterprise consolidation, they also must make proper arrangements for their regular work. This year, some land reclamation areas suffered many difficulties because of adverse weather and various natural disasters. There also were many labor problems. We must mobilize the broad staff and workers to promote a strong sense of responsibility and strive in all possible ways to fulfill or overfulfill this year's production management plan.

11582
CSO: 4007/572

RURAL FAIRS, MARKETS 'FLOURISHING'

Beijing ZHONGGUO NONGMIN BAO in Chinese 15 Aug 82 p 1

[Article: "Rural Country Fair Trade Flourishes in Wake of Third Plenary Session; Volume of Business of the More Than 40,000 Rural Country Fairs in the Country Amounted to More than 20 Billion Yuan In 1981"]

[Text] In the wake of the Third Plenary Session [of the 11th Party Central Committee], agricultural production has developed, city and countryside trade has become lively, and rural country fairs have increased concomitantly. Today, rural country fairs in the country number more than 43,000, of which somewhat more than 1,000 have been added since last year. In 1981, the volume of business done at rural country fairs amounted to more than 20 billion yuan.

During the first half of this year, commodities sent to market at rural country fairs continued to increase, and both purchases and sales were lively. Statistics from 206 representative rural country fairs in China showed a 440 million yuan volume of business for the first half of this year, a 23.4 percent increase over the same period last year. The volume of transactions in major commodities was also up over the same period last year, including grain by 8.4 percent, edible vegetable oil by 32 percent, pork by 16 percent, hen's eggs by 32 percent, vegetables by 19 percent, tobacco by 25 percent, draft animals by 16 percent, and shoats by 9 percent. Household furniture, civilian construction materials, and iron and wood manufactures also increased greatly. A particularly large amount of small farm implements went to markets, and trading was brisk. Statistics from 17 country fairs in Sichuan showed that as compared with the same period last year, transactions between January and May this year increased 1.5 fold for grain sunning mats, 39 percent for large wicker baskets, 28 percent for carrying poles, 70 percent for winnowing baskets, and 41 percent for night-soil buckets. In Yanbei Prefecture in Shanxi Province, volume of transactions in the means of production during the first half of the year increased 2.4 fold over the same period last year. Manure baskets and hoes, which had formerly been hard to find in markets, could now be bought. As a convenience to commune member's, Ningxia established special small farm tool markets in fairly large fairs. During the first half of the year, the Chengguan Fair in Wuzhong County made sales of 293 hand tractors.

During the first half of this year, the amount of small daily use commodities going to markets also increased. Statistics from 206 fairs in the country show more than double the volume of transactions in industrial products used in daily

life during the first half of this year as compared with the same period last year. In Hebei Province's rural fairs, small goods used in daily life such as sundries, metal fittings [nails, wires, hinges, bolts, locks, etc], small knit goods, small toys, and small plastic items enjoyed a 1.4 fold increase in volume of transactions over the same period last year. In Zhejiang Province, volume of transactions in small items used in daily life during the second quarter almost doubled over the same period last year. Prices of most of these small articles were close to or somewhat lower than the state-run retail price, and buyers were fairly numerous. During the first half of this year, prices of goods at rural country fairs were stable. Except for the month of January when prices rose by an average 2.3 percent over the same period last year as a result of the new year and the lunar new year, in all other months the rate of price increase was around 1 percent. Prices were 1.9 percent lower at the end of June than at the end of May. Decline occurred in the price of grain, tobacco, sesame, pork, poultry eggs, vegetables, nuts and fruit, sundries used in daily life, firewood, the agricultural means of production, and livestock.

9432
CSO: 4007/578

METHOD FOR FIGURING ECONOMIC BENEFITS OF FARMLAND IRRIGATION OUTLINED

Beijing ZHONGGUO SHUILI [WATER CONSERVANCY IN CHINA] in Chinese No 3, 1982 pp 39-40

[Article by Sun Hongming [1327 3163 2494]: "Exploration of Methods of Figuring Farmland Irrigation Economic Results"]

[Text] No common conclusion has yet been reached on methods for calculating economic results from use of water resources for farmland irrigation in China. I believe that the economic benefits of water in farmland irrigation should rest on the common principle of the results of production in a socialist society, namely, that the results of socialist production should be to satisfy increase in the people's material and cultural standards of living, and that the most important element in assuring this increase is improvement in the social labor productivity rate. This reflects the relationship between objective cause and effect between society's expenditure of labor and its economic results. Consequently, it is necessary to use, both rationally and highly effectively, production resources and natural resources to increase the results of social production. In this way increases in the social labor productivity rate and improvement in results of all social production, or of individual sectors of production, constitutes a criterion for judging economic results from the use of water resources.

In irrigation, water is the main element in improving the soil's economic fertility. It provides optimum possibilities for assuring consistently high crop yields. Irrigation acts principally to improve the soil, and water also become an intermediate "product" in soil improvement, but not a final product. Thus, water further becomes a basic means of production in irrigation agriculture. To judge the economic effectiveness of irrigation water (or, say, the economic benefit of that portion of water resources used in irrigation) according to the results of agricultural production from the watered area, I believe is methodologically desirable. Therefore, the total benefit per unit of area of irrigated farmland minus the total benefit per unit of area of dryland, under similar conditions (climate, soil, fertility, seeds, closeness, plant protection, tools, and field care), constitutes the economic benefit of irrigation, which is the economic benefit of water in agricultural production. Of course, one may also calculate the economic benefits derived from the use of irrigation on the basis of the difference between the total output value, gross earnings, net income (profit) and value of yields per unit of area provided by watered land and the

total output value, gross earnings, net income (profit), and output value per unit of area from dryland. As compared with economic benefits in increased work efficiency resulting from technological innovation in industry, this method of calculation is both simple and easy to calculate.

Results derived from the use of this method to figure the economic benefits of irrigation in several prefectures of Qinghai Province are provided below:

1. Xiaoxiaqu Irrigation Area. Located in Ping'an County in Qinghai Province, this is an old irrigation area in the Huangshui Basin, which underwent reconstruction in 1963 and now irrigates an effective area of 11,000 mu. Irrigation during the first year following reconstruction produced grain (wheat) yields of 400 jin per unit of area (average value for the irrigation area), which subsequently continued to increase to 600 jin (in 1972), 745 jin (in 1975), and 857 jin (in 1979). Meanwhile, during the same period, under the same conditions, dryland yields of wheat amounted to from 250 to 375 jin per unit of area. Economic benefits should be 400 jin--250 jin = 150 jin, and on to 857--375 jin =482 jin.

2. Xiaozao Irrigation Area. Located in the Wutumeiren Xiaozaohuo region of Geermushi in the Tsaidam Basin, it is an inland river system. Rainfall in the area is scant and hot dry winds are frequent. This irrigation ditch area was built in 1970 to irrigate a 4,200 mu area. Under the same conditions, dryland wheat produced yields of 200 jin per mu, but following irrigation yields became 475 jin per mu (irrigation area average), and a maximum of 1,000 jin per mu. Economic benefits of irrigation were 475 jin--200 jin = 275 jin.

3. The Gandu Commune Irrigation Area in Hualong County. Located along the Huang He where rainfall is fairly good, the irrigation area is 13,000 mu. Under similar conditions, dryland wheat yields were 300 jin per mu. Following irrigation, the average yield for the entire irrigation area was 890 jin per mu (in 1980). Economic benefit was 890 jin--300 jin = 590 jin.

4. Beishanqu Irrigation Area. Located in Menyuan County in Haibei Zhou. Designed to irrigate an area of 53,000 mu, in 1980 it actually irrigated 34,900 mu. It is part of the Datong He Basin where there is a fair amount of rainfall and where dryland yields were 250 jin per mu. Following irrigation yields were 400 jin per mu, the economic benefit being 400 jin--250 jin = 150 jin.

The Huangshui Basin, the Huang He, and the Tsaidam region in the province have long hours of sunshine daily, and the soil is good making them good places for development of agriculture. The actual examples calculated in the foregoing show the following: Water conservancy work holds an important position in Qinghai's agricultural production; its role in increasing agricultural yields is tremendous. Were a low average value of 250 jin per mu used to calculate the overall average increased yield per mu of irrigated land as compared with dry land for the province as a whole, the province's 2.8 million mu of irrigated land could grow an additional 760 million jin of grain each year. This shows that the construction of water conservancy in Qinghai has made a tremendous contribution to increases in agricultural production.

Benefits in increased agricultural production of water resources in other areas differ. Intensified research on the benefits of water resources has real value in guiding future water conservancy construction and the development of agriculture.

9432
CSO: 4007/578

NONENGINEERING MEASURES IN FLOOD PREVENTION URGED

Beijing ZHONGGUO SHUILI [Water Conservancy in China] in Chinese No 3, 1982 pp 7-9

[Article by Wang Juemou [3769 0628 5399]: "We Should Stress Nonengineering Measures in Flood Prevention"]

[Text] At present, there are generally two types of flood prevention measures: one type is referred to an engineering type flood prevention measures and the other, nonengineering type flood prevention measures. Included among engineering prevention measures are the construction of water reservoirs, clearing areas for flood retention and storage, dike construction, regulating river channels, opening up of flood diversion channels, and building large pump stations; all the above-mentioned are flood prevention projects. Included among the nonengineering flood prevention measures are flood forecasting and alerts, classification and management of flood areas, flood prevention insurance, and social relief. The popularity of nonengineering measures is due to the large land areas and investment required in engineering measures, especially in large flood prevention projects; some projects even occupy more land than the protected area downstream. Large investments in flood prevention are especially painful for developing countries because they are unable to construct sufficient flood prevention projects in a short period of time. Even in some developed countries, because most projects have been completed on dam sites with better conditions, economic benefits are doubtful from the remaining difficult and high-investment projects with troublesome problems of relocating area inhabitants. Therefore, the nonengineering measures have been more and more stressed with faster growth.

I. Nonengineering Flood Prevention Measures Cooperate With Mother Nature.

Engineering-type flood prevention measures can be regarded as those measures which reshape natural settings; since the natural characteristics of floods are modified by engineering means in order to prevent or reduce flood damage. Nonengineering flood prevention measures are not intended to modify natural flood characteristics; instead, the effects of flood damage are to be relieved in order to reduce the damage; therefore, nonengineering measures can also be called measures cooperating with nature.

Flood forecasting and alerts: Before flooding occurs, forecasts and alerts are transmitted in order that timely urgent measures to avoid flood damage and to hold flood losses to a minimum be taken. Under flood forecasting and alerts,

timely measures of flood diversion and storage can be adopted; appropriate flood prevention actions on water reservoirs can be taken; and timely emergency repair of flood prevention facilities and evacuation of area inhabitants can be carried out to cope with the flood. For example, in the case of the floods of July 1981 in the upper reaches of the Yangtze River, at Chongqing Municipality the government took advantage of flood forecasting to order evacuation to safe areas of 220,000 inhabitants as well as moving the industrial plants and governmental organizations along the river banks. Thus, the upheaval of people's lives and property was considerably reduced.

The effect of flood forecasting and alerts is closely related to how accurate and effective the information is. Generally speaking, the higher the forecast accuracy and the earlier it is made, the smaller are the losses caused by the flood. Therefore, we must do our best to improve the technical means of communications and computation in order to enhance reporting accuracy and to extend the effective prediction period.

The classification and management of flood-damage areas: we can base our approach on different flood frequencies and degrees of flood damage to classify flood areas in order to take appropriate measures. In some cases abroad, flood damage areas are classified into three zones: (1) The strictly forbidden zone: no permanent structures are allowed in zones with an average of one flood occurring every 5 years; additions to existing structures are banned. (2) Restricted zone: relatively lower economic-value structures are allowed in zones with an average of 1 flood every 5 to 20 years; these structures should have flood prevention facilities, such as roof platforms and village dikes. (3) Alert zone: structures can be free of restriction in zones with an average of 1 flood for every 20 to 50 years. However, inhabitants in these zones should be alerted; upon receiving flood forecasts or alerts, appropriate actions should be taken.

At present, there are large numbers of inhabitants in most flood zones in China, especially on river banks, in areas of flood diversion and storage, and along river channels downstream from water reservoirs; there are many structures and some are still under expansion. Considerable damage will result if a flood happens. So, it is significant to reduce damage in flood areas by proper classification of flood zones in guidelines or laws with enforcement by management.

Flood prevention insurance: insurance can reduce losses incurred by inhabitants and enterprises in the flood zone; the loss is not paid out all at once but in installments. This can be valuable in stabilizing people's livelihood and social order, as well as in reducing the burdens on the state. For example, during the Sichuan flood in 1981, more than 60,000 yuan of indemnity was paid out by insurance companies to 210 insured households; altogether, 77.28 million yuan of indemnity was paid out to 1,490 commercial and industrial enterprises incurring flood damage.

Additionally, every year inhabitants and enterprises subscribing to flood prevention insurance should pay premiums; thus, they have an awareness of possible disaster. This is what we often said "Be Alert and Overcome Apathy." This can be a relatively effective "mobilization" linking economic benefits. If the amount of insurance premiums can be classified and linked with flood zones, un-

planned construction in the flood zone can be effectively restricted. In addition, the purpose of flood prevention insurance is not simple, passive indemnity; more important is the protection from future occurrences. This concept can mobilize more social forces to engage in flood prevention activities and to promote flood prevention.

Social relief: this category serves to mobilize social resources, state resources, or even international resources to reduce flood damage to individuals and collectives in order to restore production as quickly as possible and to reduce damage caused by floods.

China has a relatively rich experience in flood prevention and relief; this demonstrates the superiority of the socialist system, since all area populations unite to extend a helping hand once a disaster strikes; this is self-relief by means of production incomes. The state allocates flood prevention and relief funds for these activities. This is also an important guarantee of China's victory over the years of the flood prevention struggle.

II. Engineering Flood Prevention Measures Should Closely Coordinate With Nonengineering Measures, in order Adequately To Exercise Their Functions.

There are still wide areas in China lacking any engineering flood prevention measures. In these areas, existing flood prevention measures are only nonengineering measures, emergency measures of temporary repair of flood facilities, and evacuation from floods upon receiving flood forecasts and alerts. Even in areas with engineering measures, their implementation relies on close coordination with nonengineering flood prevention measures.

After 32 years of difficult struggle, China has built many dikes, water reservoirs, and flood prevention projects. It has cleared flood retention and storage areas and constructed dikes to increase considerably the flood prevention capability of rivers. However, flood prevention standards are still low. Once there is a very high-water-mark flood, we only can ensure project safety and reduce flood damage by emergency measures of temporary repairs to flood facilities based on flood forecasts and alerts. In Japan, standards of flood prevention designs are not high; generally, concrete dams are designed for large floods which occur once every 100 years; earth and masonry dams are designed to withstand large floods occurring once every 200 years. The Japanese approved standard for floods is an addition of 20 percent to their design standard. However, the Japanese closely empahsized building automated systems, such as hydrological sounding and reporting, as well as communications dispatch, capable within a few minutes, of flood forecasting and alerting together with the corresponding dispatch measures. These nonengineering flood prevention measures can make up for the deficiency of lower standards in construction projects.

The dispatch and operation of flood prevention projects should be coordinated with nonengineering measures in order to gain the maximum economic benefit. For example, in flood prevention dispatch of water reservoirs, the reservoir water may be drained in advance, based on flood forecasting to vacate flood prevention capacity in the reservoir in order to reduce the flood flow when it comes.

Reservoir drainage can be controlled based on flood forecasts in the upper and lower reaches of the reservoir in order to moderate the flood peak downstream for safety's sake. Operations in the zone of flood retention and storage should also be conducted in this way so that flood forecasts and alerts as well as analysis of water situation should be consulted to see whether and when the flood prevention operations should begin, how much flood diversion is necessary, when prevention operations should be suspended, and when the inhabitants in zones of flood retention and storage should be evacuated. Appropriate activities should be taken for the best effects. Otherwise, damage will still occur even with these flood prevention projects.

III. We Must Stress and Strengthen the Buildup of Nonengineering Flood Prevention Measures.

Over a considerably long period, restricted as we are by scientific and technical levels as well as by financial and material resources, we are unable to completely control mother nature; this is so in the case of flood control. Therefore, in the struggle against nature (including combating floods), we should not only study and reform nature, but also pay close attention to studying how to cooperate with nature. In the coming construction of flood prevention projects, except for meeting the requirements of the national economy and the construction of some necessary flood prevention projects, we should pay more attention to the study and reinforcing of nonengineering flood prevention measures by cooperating with nature.

In nonengineering flood prevention measures, some (such as the classification and management of flood-damage zones) require the drafting of rational approaches advanced by water conservancy departments; the state promulgates rules and policies with emphasis on management authority for strict execution. The water conservancy departments should be coordinated with other departments and social circles to execute some measures, such as flood insurance and social relief. China still lacks experience in some measures requiring the trial-and-error approach. However, flood forecasting and alerting measures are relatively established; this is the most important and the greatest effect in nonengineering flood prevention measures. This is also one flood prevention measure with the most rapid advances worldwide.

At present, long-term flood forecasting worldwide is not yet established and cannot be used as the basis of flood prevention measures. At present, we still rely on short-term flood forecasting based on precipitation amounts and water situations in the upper streams. However, the forecasting period is very short in some rainstorm areas and mountains, especially in the medium-sized and small valleys in the case of short-term flood forecasting. Thus, we frequently are unable to meet the requirements of flood prevention measures. In order to extend the effective flood forecasting period, in some countries automation systems were established in key flood prevention areas and at important water conservancy projects; these systems include flood sounding and reporting, communications dispatch, and flood alerts using advanced means of communications, such as ultrashort waves, microwaves and communications satellites (in some cases) to collect information on rainfalls, water and repair acitivites by remote sensing stations, as well as the transmission of forecasting and alarm and dispatch of repair activities.

Since the spacing of hydrology remote sensing stations at present is still unable completely to cover the needs of rainfall information in river valleys, rain-gauging radars have been used in the United States and Japan in principal rainstorm and flood areas. By now, rain-gauging radar can supply data to enable indoor displays or printouts of quantitative rainfall distribution of more than 30,000 square kilometers of valley area; the data are as accurate as having a rainfall station for each 200 square kilometers; the data also indicate the qualitative rainfall distribution over more than 120,000 square kilometers. In recent years, in the United States a satellite cloud atlas was used to estimate the rainfall distribution in a larger area. These techniques play a major role in understanding the variability of rainfall in space and time, in enhancing accuracy in flood forecasting, and in dispatching flood prevention operations. In some countries, these means of communications provide linkages between flood forecasting, automatic control of water conservancy projects, and the automatic flood alert system. In the case of Japan, these automatic flood alert systems have been installed on 107 rivers. Generally, these systems are linked with an electronic computer, which processes this collected data; so the processing of the collected data and forecasting of the dispatch calculation are very rapid, usually only several minutes for the entire process. This not only considerably enhances the effectiveness of flood forecasting, but also improves forecast accuracy.

Flood forecasting accuracy in China advanced rapidly from several points to wide area since the liberation; flood forecasting played a major role during the years of the flood prevention struggle. However, the technical means of flood forecasting is still relatively backward; generally, telephones and telegraphs in the posts and telecommunications system are used to collect water information and dispatch flood prevention activities. Manual work is involved in flood forecasting, dispatch and computation. Usually, 4, 5 or even more hours are required to carry out flood forecasting and process computation. This technique of flood forecasting cannot meet the requirements of flood prevention, especially the requirements of relatively fast flood flows and areas in need of urgent flood prevention activities.

One characteristic of flood prevention in China is that the elevations of areas in the middle and lower streams of major rivers are located below the flood water level of these rivers. Generally speaking, protection against flood relies on more than 160,000 kilometers of dikes and many zones of flood retention and storage. The threat from flooding in these areas is quite high; the safety or flooding of these areas affects China's performance in the national economy. Therefore, the mission of flood prevention is quite important with a long line of flood defense. Secondly, the rainstorm flood has high water levels and its arrival is swift in some key areas of the middle and upper streams of major rivers; this situation is critical in flood prevention characteristics to improve China's flood forecasting and alerting system with planning and priority. For the time being, we still must rely on existing facilities of the posts and telecommunications system to better exploit their potential in flood prevention. Additionally, we should sufficiently utilize microwave trunk lines completed in recent years by the posts and telecommunications system. Our water conservancy departments are unable, or find it unnecessary, to install exclusive trunk lines. However, at the key river sectors of flood prevention in the middle and

lower streams of China's major rivers, such as the middle and lower streams of the Yellow River, the sector from Yichang to Hankou of the Yangtze River, the trunk of Huai River, areas of the Yi and Shu Rivers, and the middle and lower streams of the Hai River, the water conservancy departments can build exclusive microwave branch lines at the key aforementioned flood prevention river sectors if the posts and telecommunications system has not considered building microwave networks. Next, in some key flood prevention areas mentioned above, flood sounding and reporting as well as an automatic system of communications dispatch (better yet, rain-guaging radar) should be gradually installed; a flood alerting system should be operated on a trial basis in key areas of flood diversion and storage. In some provinces (municipalities or regions) with the heavy task of flood prevention or with key water reservoirs, trial operation of an automatic system of flood forecasting and communications dispatch should also be started. This work should be included in the long-term plan of water conservancy departments, regarded as an item of capital construction. By spending a certain amount of water conservancy funds to emphasize this work, we can gain the best return of benefits while eliminating damages at minimum costs when compared to funds required for construction facilities.

10424
CSO: 4007/573

RURAL ECONOMY REPORTED THRIVING OVER 3 YEAR PERIOD

Beijing ZHONGGUO NONGMIN BAO in Chinese 19 Aug 82 p 1

[Article: "All Around Development of the Country's Farming, Forestry, Animal Husbandry, Sideline Occupations, and Fisheries, and General Increase in Peasant Income; Policies in the Wake of the Third Plenary Session Show Tremendous Power"]

[Text] The correspondent recently learned from the Ministry of Agriculture, Animal Husbandry and Fishery that since the Third Plenary Session of the 11th Party Central Committee, the country's agricultural production has achieved sustained and steady all around growth. This trend of development, which is currently in the ascendant, is such as has rarely been seen since founding of the People's Republic.

The Third Plenary Session of the 11th Party Central Committee convened in December 1978 conscientiously summarized the lessons of experience in agricultural production since the founding of the People's Republic, corrected leftist errors, put forward various rural policies for the present stage, and adopted various major policy measures for hastening development of agriculture. CPC committees and people's governments in all jurisdictions assiduously put into effect an honoring of the self-determination of production teams, institution of agricultural production responsibility systems, readjustment of the rural economic structure and production patterns, development of economic diversification, revival of country fair trade, and increase in procurement prices paid for agricultural products as a series of policy measures to enliven the economy and arouse the enthusiasm of the broad masses of peasants, eight hundred million peasants produced contentedly and diligently.

First was to get all around development of agricultural production. Despite the frequent disasters encountered between 1978 and 1981, gross output value of agriculture annually increased at a rate of 5.6 percent to exceed the average speed of 3.5 percent annual growth between 1953 and 1981, presenting a thriving scene of all around development of farming, forestry, animal husbandry, sideline occupations, and fisheries.

Comparison of major farm product output in 1981 with 1978 shows the following: Grain up by 6.6 percent and for cotton, oil-bearing crops, sugarcane and sugarbeets, increases of 36.9, 95.6, 40.5, and 135.4 percent respectively, all of which were all time highs since founding of the People's Republic. Mulberry silkworm cocoons, tea, tobacco, and such economic crops also showed large increases.

Particularly gladening was that the country's grain output broke through a sustained situation of fluctuation. For a period of time prior to 1978, it had fluctuated for a long time around the somewhat more than 500 billion jin mark, but during the past 3 years, despite increases and decreases, grain output broke the 600 billion jin mark. In 1979 and 1981 output was the highest and second highest since founding of the People's Republic. This year's summer grain crop was up again over last year. Average amount of grain per capita also increased from the somewhat more than 500 jin prior to 1978 to somewhat more than 600 jin. In 1978 China had to import grain, cotton, edible oil, and sugar, Now, however, except for the continued import of some grain needed for readjustment of the structure of agriculture, as a result of great increases in output, cotton and sugar imports have decreased over the years, and in 1981 edible oil was exported rather than imported.

During the past several years livestock industry production has also flourished for a new situation of all around increase. A comparison of 1981 with 1978 shows total national output of pork, beef, and mutton up by 47.2 percent, and a 59.6 percent increase in foriegn exchange earnings resulting from the export of livestock and poultry products and of some processed products. Volume of exports of hog bristles, hog casings, rabbit fur, rabbit meat, honey, feathers, and goat hair were the highest in the world.

For acquatic products, between 1979 and 1981 output of freshwater fish rose 30 percent over 1978 for the greatest consecutive 3 year increase since the 1960's. Rearing of certain traditional marine products is gradually being revived and valuable varieties that can be provided for export such as prawns and scallops have been developed.

Since the Third Plenary Session, annual gross output value of commune and brigade enterprises has averaged a 16 percent speed of incremental increase to become a powerful mainstay in the consolidation and development of the rural collective economy. As a result of readjustment and reorganization, in 1981 the number of enterprises and personnel in them were fewer, yet total earnings still increased by 12 percent over 1980, amounting to 67 billion yuan.

Changes have also been remarkable in the state farm and land reclamation system during the past 3 years. Ever since the Third Plenary Session of the 11th Party Central Committee, state-owned farms have carried out a readjustment, and production has attained all around development. The year 1979 brought an end to the loss situation that had endured for more than 10 years, with profits of 397 million yuan. In 1980 again there were profits of 660 million yuan. For the 2 years, total output of grain (including soybeans) and commodity grain increased by more than 1 billion jin. Industry

and agriculture's gross output value increased 5.6 percent. During 1981, 44 percent of the cultivated area in state farm and land reclamation zones sustained disasters, but apart from a decline in output of grain and stud hogs, production by all sectors of the national state farm and land reclamation system rose. Industrial and agricultural gross output value increased 0.2 percent for profits of more than 200 million yuan. In addition, in production a start was made to move away from farming alone into diversified farming, industrial, and commercial activities.

During the past several years a "craze for science" has taken place in rural villages, with peasant enthusiasm for studying science and using science reaching unprecedented heights. Gradually traditional production experiences are gradually being combined with modern science. In rural villages, in order to meet the need for scientific farming, all kinds of organizations for the popularization of science have hurried to organize technical forces to send scientific and technical knowledge and achievements into rural villages. The work of disseminating agricultural science and technology has developed rapidly in rural villages throughout the country. Agricultural education work is also being revived and developed. The CPC Central Committee and leaders at all levels pay close attention to the "investment in intelligence." It may be seen that a new era is arriving in which China's agricultural production and rural construction depends on modern science and technology.

Accompanying implementation of the party's rural policies has been fairly rapid development of the rural commodity economy, and the rural economy has come alive. Commune member private plots have been restored and encouragement and support given household sideline occupations. There has been a liberalization of country fair trade for a revival of traditional rural markets and fairs such as early markets, pre-dawn markets, night markets, night fairs, mountain markets, old style fairs, and horse and donkey markets. Large and medium size cities, including Beijing, have made special efforts to open farm trade markets within their municipal areas in which the lines of goods are complete, numerous varieties of agricultural sideline products are offered, and in which commune and brigade industrial products and native specialties are displayed in large numbers for an expansion of the exchange of goods, to supplement goods not available from state-owned businesses, and to satisfy the needs of the masses in daily life in an unprecedented flourishing of city and country markets. Statistics show the volume of business in country fair trade to have increased 68.6 percent between 1978 and 1980, and in 1981 the volume of trade increased again.

The excellent situation in China's rural villages during the past more than 3 years has been manifested in a concentrated way in a general increase in peasant income and remarkable improvements in standards of living. In 1981 national average per capita income from collective distributions for the agricultural population reached 116.20 yuan, a 31.3 percent increase over the 88.50 yuan of 1978. In 1981 average per capita purchases of consumer goods by rural residents was 117.40 yuan, an 85 percent increase over the 53.90 yuan of 1978.

In places where natural conditions are good and agricultural resources fairly abundant, and in large suburbs and frontier pastoral areas, during the past 3 years some communes and brigades have become wealthy. In 1979 production brigades throughout the country in which commune member average per capita earnings from collective distributions amounted to more than 300 yuan numbered 1,622. In 1980, this increased to 5,569, and in 1981 to 10,943, a 96.5 percent increase over 1980. In addition, substantial turn for the better occurred in a number of brigades and communes that had for long been poverty stricken. In 1980, 72 of the country's 210 impoverished counties in which average per capita distributions had been below 50 yuan for 3 consecutive years broke out of their impoverished state for the first time. Average per capita consumption figures for commune households rose 27.27 percent between 1978 and 1980, and the nature of expenditures also improved. Survey of income and expenditures by more than 18,000 commune member households in 536 counties showed the number of hardship households averaging net per capita annual incomes of less than 100 yuan had fallen from 33 percent in 1978 to 10 percent in 1981.

Between 1978 and 1980 newly built rural housing amounted to 900 million square meters, and in 1981 another 600 million square meters of new housing was built, the amount increasing year by year.

Overall, during the past more than 3 years rural development has been heartening and encouraging. Facts have provided a potent reply to the following issue: The socialist system is genuinely superior. With correct programs, policies, and measures, it is able to stir the enthusiasm of the broad masses. Our socialist endeavors hold great hope.

9432
CSO: 4007/579

GREATLY INCREASED GRAIN PROCUREMENT REPORTED

Beijing RENMIN RIBAO in Chinese 11 Aug 82 p 1

[Article: "Number of Anhui Counties Making Sales to the State of 100 Million Jin of Commodity Grain Increases to 40, Amounting to More Than Half the Counties in the Province; Twenty Counties Provide More than 200 Million Jin of Commodity Grain; Institution of a Responsibility System Whereby Production Is Contracted to Households Has Rapidly Transformed a Poverty Stricken and Backward Situation"]

[Text] During the 1981 grain year (from 1 June 1980 until 31 May 1981), the number of counties in the province selling more than 100 million jin of commodity grain to the state rose to 40 from the 22 during the 1977 grain year. This amounted to more than half the total number of counties in the province, twelve of which provided more than 200 million jin of commodity grain. After the 1982 grain year began, enthusiasm for selling surplus grain ran high among the peasants, and everywhere in the province the grain procurement situation was even better than last year.

Among the counties that sold more than 100 million jin of commodity grain to the state, quite a few had developed production only slowly in the past, and had eaten grain provided by the state or grain resold to them. As a result of the disturbance caused by "leftist" ideology in the past, these counties had long been unable to change their poverty stricken and backward situation, and commune member problems in getting enough to eat and to wear had not been solved. After the Third Plenary Session of the 11th Party Central Committee, these counties instituted the contracting of production to individual households and the contracting of work tasks to individual households at a fairly early time. As a result, they made a new beginning fairly quickly, and manifold increases occurred in both grain output and the amount of commodity grain provided the state. Between 1963 and 1977, Chuxian Prefecture had never been able to fulfill its more than 500 million jin state procurement and excess procurement grain quotas, but in the 1981 grain year it provided the state more than 1.36 billion jin of commodity grain. Each of seven counties in the prefecture sold the state more than 100 million jin of grain. Long famous as a poverty stricken county, Fengyang County ate grain resold to it by the state for more than 20 years following liberation; but in the 1981 grain year it sold the state 235 million jin of grain. Formerly, in a year of good harvest, Tianchang County was able to sell the state only 60 or 70 million jin of grain, but in the 1981 grain year it sold the state more than 300 million jin. Huaiyuan County on the banks of the Huai He sold somewhat more than 130 million jin of commodity grain to the state in 1977, but in 1981 this increased to more than 390 million jin, making it the county in the province that sold the most commodity grain to the state.

9432
CSO: 4007/578

PROGRESS ON WATER, SOIL CONSERVATION REPORTED

1982 Semi-Annual Status Report

Lanzhou GANSU RIBAO in Chinese 19 Jul 82 p 1

[Text] The province has made very good achievements during the first half of this year in its water and soil conservation activities centering around afforestation and the planting of grass and emphasizing control of small drainage areas. As of the end of June it had completed control of an erosion area of 1,060 square kilometers. An area of 1,16 million mu had been afforested, and a mountain area of more than 98,000 mu had been closed to permit forests to grow. Grass was planted on more than 220,000 mu of bald mountains and barren slopes, and the number of level terraced fields, level strip fields, compacted sandy fields, and dammed ravines built greatly increased over the first half of last year. This year 649 small drainage basins were listed as the principle areas to be controlled. The area planned for control covered 410 square kilometers, and during the first half of the year 277 square kilometers of it had already been completed. This amounted to 67 percent of the planned task, and 58 percent more was completed than during the same period last year.

Editorial Comment

Lanzhou GANSU RIBAO in Chinese 19 Jul 82 p 1

[Article by Commentator]

[Text] Recently the State Council published "Regulations on Water and Soil Conservation Work," and diligent implementation of these "Regulations" is extremely important for Gansu Province. Erosion in the province is serious. The total amount of silt entering the Huang He annually amounts to more than 50.07 billion tons. Though definite achievements were made following Liberation thanks to the arduous efforts on the part of the broad masses of cadres and people, as a result of the "leftist" disturbance much reckless clearing of land and excessive digging was done and natural cover destroyed in the process of harnessing rivers and mountain streams. There was much putting on of airs and practice of formalism. Engineering measures were emphasized and biological measures slighted. In an effort to do much in a great hurry, blind and rash actions were taken that violated both natural and

economic laws causing great losses in water and soil conservation work. In recent years quite a few places have slackened efforts in water and soil conservation work. Large tracts of fertile soil go billowing toward the sea. In some places bare rocks protrude; it has become hard for a drop of water to soak in, and not a blade of grass will grow. Therefore, the water and soil conservation task that stares us in the fact is still a very major one. Leadership cadres at all levels must understand the important significance of water and soil conservation and adtop effective measures to do a good job of water and soil conservation work.

Since Liberation, Gansu Province has accumulated much valuable experience in water and soil conservation work, and every jurisdiction should diligently summarize experiences from their own realities. Experiences in water and soil conservation that have been found workable and effective for many years should be spread. Right now, special attention should go to a close combination of engineering and biological methods, with projects being built before afforestation is done so that living plants will protect projects and projects will protect living plants for mutual advancement, to hasten the pace of control, and to improve economic benefits.

How water and soil conservation work is to be developed following institution everywhere of agricultural production responsibility system is another problem urgently requiring study and solution. For example, organization of leadership, disposition of workforces, assignment of quotas, compensation for labor, distribution of earnings, etc. all require that methods be devised. Some places already possess some experience in this regard, such as use of centralized planning in capital construction of farmland, leaving some land for the peasants use, centralized assignment of workforces, and concentrated efforts toward control. Alternatively there can be voluntary participation in control by groups of households working together, or quotas may be assigned brigades or households, each being responsible for work in their own areas with apportionment of benefits. In afforestation and the planting of grass there can be either centralized planning done by the collective for afforestation and the growing of grass with communes and brigades providing seeds and seedlings, commune members providing the labor, and earnings divided, or there can be assignment to commune members of "three barren lands" with benefits from them going to those who plant them. No matter the method instituted, responsibilities are to be clearly defined, compensation reasonable, and efforts unflagging so that the masses realize real benefits. Only in this way will it be possible to arouse the enthusiasm of the broad masses for large scale water and soil conservation to gain good effectiveness.

9432
CSO: 4007/581

HALF YEARLY RURAL LOAN SITUATION REVIEWED

Lanzhou GANSU RIBAO in Chinese 4 Aug 82 p 1

[Article: "Province Issues 270 Million Yuan in Loans For First Half of Year Two Million Commune Member Households Get Loan Support"]

[Text] "Loan amounts large and coverage broad, things supported numerous, and economic benefits remarkable." These are the fundamental characteristics of the province's agricultural loans for the first half of this year.

Gansu's agricultural loans for the first half of this year differ in five particulars from those of former years as follows: One is a tremendous increase in loans, the accumulated total of agricultural loans issued during the first half of the year being 270 million yuan, a 48.6 percent increase over the same period last year and close to the total amount issued during all of last year. Second is the broad coverage of loans. Commune members in the province receiving loans numbered close to 2 million households, which was 60 percent of all farm households. Volume of loans issued them was 174 million yuan, a 1.74 fold increase over the same period last year for an average of almost 90 yuan per household, most of which were poverty stricken households facing economic hardships. Third, was that while supporting grain production, loans for economic diversification also increased. According to statistics, between January and June loans issued for economic diversification totaled more than 71 million yuan to support development of more than 100 different kinds of ventures. Fourth was support to the struggle against disasters with 36 million yuan being issued for commune member livelihood throughout the province. This was a twofold increase over the same period last year and included 10 million yuan of loans for grain rations, a 13-fold increase over the same period last year, and more than 140 million for help to disaster area commune members in buying grain rations. Agricultural banks and credit cooperatives at all levels instituted the "four to the doors" to meet the needs of the contracting of work tasks with individual households as follows: Delivering to people's doors of publicity on policies, visiting people's door to make thorough investigation, going to people's doors to make loan plan arrangements, and going to people's doors to handle loan procedures. They also used methods such as "loan handbooks," "loan cards," and single approval of loans for issuances at separate times. They streamlined procedures to accomodate the masses and to support production to outstanding effect.

9432
CSO: 4007/581

USES, PLANTING OF RED BEAN GRASS REPORTED

Lanzhou GANSU RIBAO in Chinese 21 Jul 82 p 2

[Article: "Trial Planting of Red Bean Grass in Gansu Province Has Spread to 24 Provinces and Regions"]

[Text] Following small area trial plantings by the Gansu Agricultural University that brought good results, red bean grass [Onobrychis viciaefolia] which has been acclaimed by foreign pasture experts as the queen of pasture grasses, has been generally welcomed in farflung arid and semi-arid areas, and has spread to 24 provinces and regions.

Red bean grass originated in France and spread throughout Europe, North Africa, and west and south Asia. It also grows wild on the semi-shaded slopes on the north side of the Tian Shan in Xinjiang Province at between 1,000 and 2,000 meters above sea level. In 1960, Gansu Agricultural University brought it in from the USSR for trial plantings. Following many years of growing and evaluation, results shows red bean grass to produce high output of good quality, of strong adaptability, and of good palatability. It is easy to grown, and is bothered by few diseases and insect pests. It is truly a superior pulse family pasture grass that has attracted the interest and serious attention of agriculture departments nationally.

In 1978 the Animal Husbandry Bureau of the national Ministry of Agriculture allocated funds and commissioned the Gansu Agricultural University to establish the country's only red bean grass seed base. By the end of 1981, by using mixing and selection methods, they had bred a superior variety of red bean grass, Changcheng No 1, and obtained more than 12,000 jin of seeds. They provided these superior seeds to more than 250 production and scientific units, and to institutions of higher learning in 24 of the county's provinces and regions to lay a foundation for its promotion over wide areas in arid and semi-arid regions.

In addition to its main use as a livestock feed, red bean grass also makes a fine green manure, a plant for soil and water conservation, and a source of nectar, which has been welcomed in the country's farflung regions. Red gean grass has a long blossoming season. Its flowers have a brilliant color, making it a plant for flower gardens and courtyards to delight the eye and be admired.

9432
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STATISTICS PROVIDED ON STATE FARM, LAND RECLAMATION SYSTEM IMPROVEMENTS

Beijing ZHONGGUO NONGKEN [STATE FARMS AND LAND RECLAMATION IN CHINA] in Chinese No 8, 82 p 11

[Article: "Changes in the State Farm and Land Reclamation Economy in Jiangsi as Shown in Figures"]

[Text] 1. Remarkable Improvement in Economic Effectiveness

The Jiangxi provincial farm and land reclamation system has turned losses into profits for 3 consecutive years beginning with 1979. In 1981 net profits amounted to 15.75 million yuan, an 89 percent increase over the previous year, and 27.15 million yuan was paid in taxes to the state, a 19.27 percent increase over the previous year.

2. Amounts of Farm and Forestry Sideline Product Commodities Increase

In addition to having provided the state with 96.63 million jin of grain, 1.6 million jin of ginned cotton, 2.14 million jin of oil-bearing crops, 1.74 million jin of eggs, and 230,000 cubic meters of timber in 1981, the province also provided more than 40 kinds of products for the foreign export trade. Export commodities were valued at 55.34 million yuan, a 28.7 percent increase over the previous year.

3. Fairly Rapid Speed of Increase in Industrial Production

The gross output value of industry reached 298 million yuan in 1981 and amounted to 66.83 percent of the gross output value of agriculture and industry combined, an 11.1 percent increase over the previous year, and a 48 percent increase over 1978. Some products represented a fair proportion of the province's totals such as monosodium glutamate, which accounted for 40 percent; down manufactures, which accounted for 90 percent; activated carbon, which accounted for 90 percent; ceiling fans, which accounted for 66 percent; and woolen yarn, which amounted to 56 percent.

4. Integrated Agricultural, Industrial, and Commercial Enterprises Make New Strides

In 1981 the province's state farm and agricultural system established 17 integrated companies at all levels participated in by 60 reclamation and cultivation

farms, and set up commercial network outlets at 167 places employing 1,481 people, volume of goods sales amounting to 29.78 million yuan with profits of 640,000 yuan.

5. Further Improvement in Staff and Worker Livelihood

In 1981 earnings of staff and workers in state farm and land reclamation enterprises in the province averaged 506 yuan, an 18 percent increase over 1979. This represented a 20 percent increase over 1979 when figured on the basis of an average per capita income of 250 yuan for the population as a whole. During the last 3 years, 330,000 square meters of new dormitories for staff and workers have been built.

9432
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ANIMAL-DRAWN CARTS FOR TRANSPORTATION URGED

Shenyang LIAONING RIBAO in Chinese 30 Jul 82 p 3

[Article: "Need To Make Full Use of Role of Animal-Drawn Carts in Rural Transportation"]

[Text] Following institution of production responsibility systems in rural villages, the number of animal-drawn carts in most counties of the province increased by more than 1,000, making them a major force in rural transportation. Animal-drawn carts are characterized by small expense, sturdiness, and easy care. The peasants' burden is small in using them, and one might say that much can be done with small expenditure of money. This fits in with agricultural production relationships and the situation in development of productivity in China at the present stage. Now that rural villages have everywhere established agricultural production responsibility systems, during the period of development toward the mechanization of agriculture, it will be necessary to go through a period in which machines and animals are used at the same time. Therefore, overly early "substitution of machines for animals," and particularly envisioning overly early substitution of tractors or trucks taking the place of animal-drawn carts in rural transportation is not realistic. It is divorced both from the present state of agricultural production and from the present state of energy production.

Reportedly rural communes and brigades in Liaoning Province have purchased more than 4,000 trucks that have been retired from service in cities, and in 1981 individual peasant purchases of medium and small size tractors ran to more than 3,000. Support should be given those used in field operations; however, some of them have also been used in non-agricultural transportation. This not only contends with urban transportation vehicles, but also wastes large amounts of gasoline and diesel fuel.

Tractors should be used principally in field operations and for agricultural transportation where animal-drawn carts cannot be substituted, and trucks should be used primarily in commune and brigade enterprises for the hauling of raw materials and products. Collective or individually owned tractors and trucks should not be used for transportation run as a business in any form. Rural villages should make full use of the role of animal-drawn carts for all forms of transportation.

9432
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LESSONS FOR EROSION CONTROL DRAWN FROM 1981 FLOOD DISASTER

Xian SHUITU BAOCHI TONGBAO [BULLETIN OF SOIL AND WATER CONSERVATION] in Chinese No 3, Jun 82 pp 21-25

[Article by Zhang Liming [1728 0448 6900], Shaanxi Provincial Soil Conservation Bureau: "Strictly Prohibit Reckless Denudation and Indiscriminate Clearing of Land to Prevent and Control Mountain Region Soil Erosion--Survey of 1981 Exceptionally Great Flood Disaster in Southern Shaanxi"]

[Text] During July and August 1981, continuously heavy and torrential rains in southern Shaanxi brought torrents of water rushing down mountains, which caused intense erosion, rolling and roaring, collapses, landslides, and mud-rock flows everywhere, and created a disaster situation in mountain regions and flatland areas such as has been rarely seen.

In recent years, southern Shaanxi has had numerous water disasters, and the heavy damage wrought by last year's floods may be accounted for by several reasons. There are natural reasons such as a fall rainy seasons that was long, brought a large volume of rain, and was powerful. This was a direct reason leading to the disaster. Another reason is the lack of centralized planning of river control, and the not very high quality of engineering. However, looked at in terms of macrophenomena, the blindness of people's production activities with the clearing of land everywhere to expand cultivation, and the reckless cutting of trees and denudation of the land that has destroyed the ecological balance and caused intense soil erosion (contemporary erosion) are the main reasons that have turned rainfall into disasters. To a certain degree, the frequency and increasing seriousness of flood disasters in southern Shaanxi are mostly the serious consequences of erosion.

1. Natural Reasons For Soil Erosion in Southern Shaanxi

Three basic natural factors are necessary in order to have soil erosion: One is an external force to produce the washing away--water; second is a corrosive material--soil or mother material; and third is a sloped terrain that is conducive to soil erosion. In the Qinba mountain region of southern Shaanxi, these three elements are present. The inland areas of that region are controlled by the circulation of the monsoon winds. It is the region of the "Western China autumn rains." In most years much rain falls in autumn, and during July and August 1981, in particular, when cold air from the north

flowed southward and collided in this area with warm humid air from the south, a highly powerful cold front rain was produced, and the quantity of rainfall greatly increased. A survey has shown that during August 1981, rainfall in that region was between one and four times the volume for the same period over the years, and the period of duration 40 to 60 days. In seven counties, maximum daily rainfall during August was more than 100 millimeters, and in the Yangping mountain pass area of Ningqiang County, on 16 August 172 millimeters of rain fell. In five counties of Hanzhong Prefecture, rainfall during August amounted to more than 500 millimeters. Among them were Lueyang and Ningqiang counties, each of which had more than 700 millimeters. During August Lueyang had 10 rainfalls of more than 30 millimeters each, seven torrential rainfalls of more than 50 millimeters each, and two heavy torrential rainfalls of more than 100 millimeters each. Between 14 and 25 August, the county had 12 days of rain totaling 627.7 millimeters, more than four times the volume of rainfall for the entire month of August in past years. In Qinba County, rainfall during August amounted to 509.6 millimeters or 4.5 times the average 130.3 millimeters of rainfall for the same period over the years. The highly powerful rainfall over a wide area was the meteorological phenomenon responsible for the great flood disaster of 1981.

Geologically and topographically, this region is part of the Tailing and Bashan mountain region. Within the region, except for the Hanzhong Basin, there are range after range of towering mountains. The Tailing mountains average about 2,500 meters above sea level. The mountains are high, the slopes steep, and the terrain precipitous. Through the Daba mountain region is somewhat lower than the Tailing mountain region, because it is fractured and uplifted, limestone distributed over a wide area, and cliffs and precipices extending one after another, the terrain is very difficult of access. In addition, the medium and low mountain areas between the two ranges are formed largely of metamorphic rock, schist, limestone, complex, and granite, which have been strongly corroded and have a fairly thick weathered layer. The hill and low mountain region is composed largely of adamic earth, and gravel, which is loose and prone to wash away, flake away, or slide. In short, the terrain here is characterized by "many mountains and little flat land, steep slopes, and a thin layer ofsoil." It possesses the terrain elements for powerful soil erosion.

2. Human Factors Intensifying Soil Erosion.

The 1981 exceptionally great flood disaster in southern Shaanxi, in mountain areas and flatlands alike, was the evil consequences of serious soil erosion. Soil erosion may be divided into natural erosion and accelerated erosion. Natural erosion is usually slow and is a geological process, but after man joins in the destruction of the natural world, development of the natural erosion process may be greatly hastened, and this is contemporary erosion. In southern Shaanxi, man made elements accelerating contemporary erosion are of the following major several kinds:

(1) Clearing of Steep Slopes For Farming and Indiscriminate Clearing of Land and Arbitrary Planting, Expanding the Eroded Area

In the Qinba mountain region the destruction of forests and clearing of land has been going on for a long time. It began during the waning years of the Western Zhou dynasty when the orindary people of the state of Zheng (modern day Hua County) moved southward to establish homes in Hanzhong County where they began a primitive slash and burn form of agriculture. During the period of the Qin and Han dynasties and the Three Kingdoms era, this area was the land in which military colonists of Liu Bang of the Han and the feudal prince Zhuge [Liang] encamped to begin development of the flatlands. But at that time there were few people here, and damage to the mountain forests was not great. Soil erosion was slight. Subsequently, during the reign of Jiajing [1522-1567] of the Ming dynasty, during a period of social upheaval, large numbers of people from the southeast flowed into southern Shaanxi (present day Hanzhong, Xixiang, and Mian counties). They settled in the mountains, built shacks for shelter, felled trees for firewood and for wood to build houses, and cleared the land for agriculture. During the period of the Taiping Heavenly Kingdom, in particular, this area became a battleground for the Nian Army and the soldiers of the Qing dynasty. "During times of small upheaval, flee the cities; and during times of great upheavals flee the countryside," runs an old saying. Large numbers of ordinary people took to the mountains, and with this the low mountains and hills and even the mountain fastness were destroyed. This situation endured right up until the years of the Republic. Because of the gradual decrease in the forest area and the gradual enlargement of barren slopes, the eroded area became increasingly large. On the eve of Liberation, the eroded area of Hanzhong Prefecture amounted to 13,000 square kilometers, which was 47.9 percent of the total land area.

Since the founding of New China, as a result of government's failure to institute planned parenthood policies at once, population increased very rapidly. In 1949, there were only somewhat more than 1.85 million people in all of Hanzhong Prefecture. By 1963, the number had increased to 2,433,000, and by 1980 it had increased to 3,349,000 for a net increase of about 1.5 million people in a 30-year period. As a result of the pressures occasioned by high speed population growth, plus mistakes made in operating programs, not only did no halt occur in the clearing of land and the expansion of agriculture, but, on the contrary, it became worse and worse. According to incomplete statistics from the prefecture, during a period of 30 years the area cleared of forests and opened to agriculture was more than 2 million mu, and in the Qinling mountain region of Baoji Prefecture, about 1 million mu of forests were also destroyed. According to records from Zhenba County, in a 30-year period, an accumulated area of 644,000 mu was cleared for agriculture throughout the county. This included the clearing of 190,000 mu between 1950 and 1958, an average 21,000 mu per year; the clearing of 364,000 mu between 1959 and 1962, an average 91,500 mu per year; no statistics for the period 1966-1970; and the clearing of 88,000 mu between 1971 and 1980 for an annual average of 8,800 mu. A survey done at Qingmuchuan Commune in Ningqiang County during the spring of 1981 showed that

573 of the 859 households in the commune had cleared land to expand agriculture over an area of 493 mu. Furthermore, 30 mountain forest fire disasters, which resulted from burning to clear the land, destroyed 241 mu of forests.

Such large-scale and high speed clearing of the land to expand agriculture has made ever larger the cultivated slopeland area of southern Shaanxi, and as soon as a torrential rain falls, erosion over a wide area results. Measurements made at the Hanzhong Water Conservation Station show that following each torrential rain, upwards of 1 centimeter of top soil is washed away from cultivated slopelands. The reported cultivated slopeland area in Hanzhong Prefecture is 3,146,700 mu (the actual area is somewhat larger), so on this basis, with each torrential rain, 28.32 million tons of top soil are washed away. The large amount of erosion has increased the volume of silt in rivers. Analysis of 24 years of data from the Wuhou Town Hydrology Station on the Han Jiang shows the modulus of silt carried annually above the measuring station to have been 804 tons per square kilometer, a maximum of 2,100 tons per square kilometer, an average volume of silt transported of 2.49 million tons, and a maximum of 8.66 million tons. In the Jialing Jiang basin, runoff is more severe. Analysis of data from the Lueyang Hydrology Station for a 34-year period showed the modulus of silt transported each year above the measuring station to have been 1,680 tons per square kilometer, a maximum of 4,030 tons per square kilometer, an annual average of 3,230 tons of silt transported, and a maximum of 7,740 tons. The foregoing statistical data show the degree of soil erosion here to be no less than that of the loesslands of the northern Wei. Because of the increase in amount of runoff, a corresponding increase has occurred in the volume of silt carried by streams, so in many sections of streams silting is becoming more and more serious. In southern Shaanxi, in particular, gravitational abrasion is dynamic. With each heavy rainfall, the bed load is very great, bringing about a situation of "carrying sand and pushing rocks along, with resulting accumulations in the streams." Sectional measurements taken at Wuhou Town on the Han Jiang show that over a 15-year period the river bed has risen by about an average 0.41 meters per year. Sectional testing at Lueyang on the Jialing Jiang shows an average annual rise of 0.6 meters.

(2) Excessive Felling and Reckless Denudation With Destruction of Forest Plant Cover and a Lowering of Ability to Hold Water Resources

Southern Shaanxi is the major forest area of Shaanxi Province. Though definite achievements have been made in the building of forestry here since founding of the People's Republic, as a result of irrational operating programs and excessive felling, plus society's consumption of timber greatly exceeding the amount of forest growth, the forest area has gradually declined; the quality of forest stands has steadily fallen, and timber reserves have become less and less. A survey done in Feng County shows that during the 18-year period from 1959-1976, the county's mature forest area declined by 480,000 mu or 71 percent of the total mature forest area. In the Taibai forest area, the felling quota for 1979 was 5,500 cubic meters, but 10,453 cubic meters was actually procured. In 1980 the felling quota for the Taibai Forestry Bureau in Shaanxi Province was 53,000 cubic meters, but 56,188 cubic meters were actually felled, 3,188 cubic meters more than quota.

Facts everywhere show that overprocurement has caused reckless felling, and that reckless cutting has exceeded the amount of growth. The Hanzhong Forestry Department has calculated a timber growth averaging 1.33 million cubic meters annually for the prefecture as a whole, while average annual consumption is 1.54 million cubic meters for the prefecture as a whole, or 15.8 percent more than growth. In Baoji Prefecture, the situation is more serious. Annual growth is 696,000 cubic meters, while annual consumption is 1,096,000 cubic meters or 1.57 times the amount of growth. Under the influence of the ultraleftist ideology, in particular, destruction of forest resources in both prefectures as a result of iron smelting, the 3-year hardship period, and the Great Cultural Revolution caused a loss of more than 3 million mu of the forested area of these two prefectures. Forestry inventory data show the forest cover rate for Hanzong Prefecture as a whole to be only 35 percent, and in the counties (or municipalities) of Lueyang, Ningqiang, Zhenba, Xixiang, and Hanzhong, where destruction has been serious, only 28, 26.1, 22.2, 21.8, and 11.3 percent respectively remain. The low mountain and hill regions are currently seriously eroded areas of barren mountains and exposed rock.

As a result of the reduction in forest area, not only do raindrops strike the soil surface directly, scouring away the soil, but the natural repository of soil moisture has been destroyed resulting in a decline in the water holding function of the vast mountain regions. Measurements show that when the space between root systems in forest soil reach 1 meter, the water storage capacity of the forest is from 500 to 2,000 cubic meters per hectare (15 mu). When there are no forests, this water storage does not exist, so naturally the water runs down slopes, greatly increasing surface runoff. Where surface runoff is overly concentrated, serious scouring of the soil takes place, and in a situation of soil saturation, where the terrain conditions are right, mud slides, landslides, and mud-rock slides occur. Incomplete statistics from Lueyang, Ningqiang, Mian, Liuba, and Nanzheng counties show that during the 1981 rainy season, landslides and mud-rock slides occurred at more than 10,000 places, most of them near highways, railroads, and rural towns where destruction of forests and clearing of land was serious, and on exposed cultivated slopes. Representative sampling done in Feng County following the disaster showed a less than 3 percent slide area in forests, only 7.9 percent in sparsely forested areas, 11.4 percent in scrub forest areas, 17 percent on uncultivated grassy slopes, and 40 percent on cultivated slopes. In Ningqiang County, where the area in which forests have been destroyed to clear land is fairly large, the disaster situation was also serious, yet in the Bashan and Tiesuo areas of the county, where the forest cover rate is better than 50 percent, there were 361 and 393 landslides respectively. Meanwhile, in the Yangping area and the Daijiaba area, where destruction has been serious and the forest cover rate is less than 30 percent, landslides were numerous and covered a wide area, occurring at 1,273 and 2,966 places respectively, and causing serious damage.

(3) Neglect of Water and Soil Conservation in Capital Construction and Lack of Centralized Planning in River Control Resulting in the Breaching of Dikes and the Bursting of Dams Adding to the Seriousness of the Flood Disaster

For the past more than 10 years, the scale of construction on three fronts in southern Shaanxi's mountain region has been fairly great, but in the building of industrial plants, the construction of highways, the opening of mines, as well as in the construction of winding mountain irrigation ditches, as a result of neglect of water and soil conservation, large quantities of sand and rock, excess dirt, and mine tailings have gone into gullies, ravines and riverbeds where they block watercourses and add to the mud and sand content. The Daan Asbestos Plant in Ningqiang, for example, annually dumps several hundred thousand tons of tailings into a waterway. This plus soil erosion in the upper reaches resulted in a 1.5 to 2 meter rise in the riverbed during a flood that occurred during the flood season last year. Another example is the section of the Jialing River at Lueyang City where three rivers converge. Because of large quantities of excess soil and waste residues dumped into the river by the Han Steelworks, a cement factory, and from the repair of roads, not only had the river bed been raised, but the river channel had been narrowed. Flood waters could not drain away smoothly, resulting in a congestion of water, a rise in water level, and the bursting of the dike to cause disaster. On the slope of the cutting through which the Baoji-Chengdu railroad line passes, and along the right of way of newly built highways in mountain areas, in particular, because of man-made changes in the stability of the natural mountain mass plus a large population, numerous farmlands, and mud-rock slides occurred everywhere. Survey shows that in the Fengzhou right of way along the Baoji-Chengdu line alone, 92 fairly large landslides occurred. In the area between Honghuapu and Shuangshipu, mud and rock slides occurred in 90 percent of the tributaries on both sides of the Jialing Jiang. They cut the roadbed in 44 places, swept away 10 bridges, and buried three stations, causing interruption of service on that line for 2 months.

In harnessing rivers, as a result of lack of centralized planning or even espousal by some places of the slogans, "Large rivers form a continuous line but small rivers have to move aside," and "Fight with the dragon king for land to get grain out of river shallows," parts of rivers have been blindly filled in to make farmland, thereby narrowing the river bed. For example, Qianjin Production Brigade in Huangsha Commune, Mian County advanced its dike 40 meters into the river, and Jiguang Production Brigade in Laocheng Commune built its river dike in the middle of the river, a difference of 200 meters from the planned line at its farthest point. As a result, when the flood waters arrived, they could not pass freely; the water level rose, and the dikes burst, and thus the damage done by the floodwaters was made greater as a result of man's efforts.

3. Strengthening of Comprehensive Control of Water and Soil Conservation Is a Fundamental Way To Reduce Drought and Waterlogging Disaster Damage.

It may be seen from the foregoing analysis that there are three major factors that cause and intensify floodwater damage in southern Shaanxi. One is natural factors, i.e., the protracted rainfall and heavy torrential rains caused by atmospheric circulation. Second is terrain factors, i.e., the high mountains and steep slopes that make up the topography of the Qinba region,

the readily weathered rock and the adamic earth, the gravel, and such geological conditions. Third is reckless felling of trees and arbitrary clearing of land as well as irrational human activities such as denudation of forests in a blind clearing of land for agriculture, fighting rivers for land in contravention of natural laws, and filling in of rivers to make farmland. The overall function of the foregoing three major factors are mutual cause and effect, which brought about last year's unprecedently severe erosion in southern Shaanxi.

We saw clearly in the course of our survey that human activities are an extremely dynamic factor, particularly the clearing of steep slopes, the reckless felling of trees, the cutting into mountains to build industrial plants and mines, careless disposal of gravel and stones, and several instances of "going at things in a big way!" These were human activities that destroyed the mountain ecological system, loosened solid materials, and destroyed the balance of the terrain. They hastened erosion and were the main factors in the tremendous damage that was caused. Therefore, in future, major efforts must be made to conserve soil and water and to launch comprehensive control as the fundamental way in which to prevent or reduce drought and waterlogging disasters. The specific actions to be taken are as follows:

1. Planned Closing Off of Mountains to Grow Forests; Major Efforts in Aerial Sowing For Afforestation; and Earliest Possible Restoration of Forest Cover. Southern Shaanxi's climate is mild; rainfall copious; and natural restorative conditions good. These conditions should be used to the full to proceed on the basis of centralized planning to designate sites that should be closed off for the growing of forests and aerial sowing, a specific number of years set, systems formulated, specialized organizations established, and management and protection enhanced. These methods produce forests quickly, require little labor, conserve expenditures for huge benefits, and should be vigorously promoted. At the same time, it is necessary to resolutely adopt effective measures. When necessary, reliance should be placed on the law and legal methods used to halt the destruction of forests and the clearing of land, the destruction of grass to grow grain, the burning off of mountains and slopes to clear them, and such bad habits. Forest area should have as their main concern the care of forests to prevent the felling of trees over wide areas and to protect forest resources.

2. Emphasis on Control of Low Mountain and Hill Regions in the Building of Basic Farmlands to Create Conditions for a Return of Land to Forests or Pastures. As population grows, human activities in low mountain and hill regions become more frequent, destruction of forests to clear land becomes serious, the area of cultivated slopes increases, and erosion becomes intense. Major control of this region, with protection of high mountain forests above and protecting the granary on the plain below, would be remarkably effective. As means of control, efforts should be directed toward comprehensive control of entire basins. Southern Shaanxi is a mountain area of soil and stone traversed by mountains and rivers in which there are numerous streams, and in which each basin constitutes an erosion unit. For each unit there must be centralized planning from top to bottom, with selection of superior variety trees for planting in places suitable for forests, preparation of the land for

afforestation, and development of native forestry byproducts. In hill areas where slopes are gentle, terraced fields rimmed with stone or earth may be built in the construction of basic farmlands. Narrow gullies and ravines should be dammed up to intercept mud and sand and to stabilize the ravines and gulches. On tracts in wide river valleys, fields should be uplifted and small water conservancy developed. Along the porifera of the hill area, and in the triangular area formed by Mian, Lueyang, and Ningqiang counties at the source of the Han Jiang, the low mountain area is fairly large and cultivated slopes numerous. Lamelliferous scouring occurs everywhere, and terraced fields should be energetically constructed. Slopes not suited to cultivation should be gradually withdrawn from cultivation for reversion to forests or grasslands. For the present, forests and grain may be grown in alternating strips so as to prevent or reduce erosion.

3. River Control Requires Centralized Planning, Comprehensive Control, and Prevention of Flooding. The flood disaster in southern Shaanxi in 1981 resulted primarily from the rains having lasted for a long time, their intensity, and their broad area of coverage. The flood prevention standards of most river defense projects could not withstand such rarely encountered floodwaters. However, in work terms, the floods were part and parcel of the present lack of centralized planning of river control and everyone going his own individual way. The streams in the Qinba area are a part of the mountain area streams. When the volume of floodwater is large and the flow violent, low-lying areas and river flood plains become extremely prone to flooding. Therefore, in controlling rivers, it is necessary to do centralized planning for upper and lower reaches, and for left and right banks in a harnessing of both the mountains and the rivers. In addition, it is necessary to adopt biological measures in combination with engineering measures for comprehensive control. Needed water storage projects to effect control should also be built to intercept and impound floodwater. When building dikes and dams, within dikes afforestation should be done to protect the dikes. Outside the dikes, billow prevention forests should be created, forests. grass, dikes, and low banks between fields used to form a coherent whole in the hope of gaining maximum preventive benefits. Overall planning that takes all factors into consideration should be done; there should be unified control of water, and strengthening of management in order to assure safety.

4. Improved Understanding: Establishment and Perfection of Basinwide Water and Soil Conservation Organizations; and Genuine Strengthening of Leadership For the Building of Southern Shaanxi's Mountain Regions. Both the Han Jiang and the Jialing Jiang are major tributaries of the Cheng Jiang. Within the basins of these two rivers are high mountains and steep slopes on which the soil layer is very thin. Once it is washed away, there will be no end to grief. In addition, this area contains numerous streams with a large volume of flow, so protection and development of water and soil resources here permits not only a reduction or avoidance of floodwater damage here, but also relates to the issue of development and use of the Chang Jiang. However, formerly people always supposed that since the mountains were green and the waters clear here, there was no erosion, so they did not give serious attention to soil and water conservation work in southern Shaanxi. This was

a mistake in our work, and we must learn this lesson. In order to develop and build southern Shaanxi's mountain regions, to make full rational use of the water, soil, grass, and timber resources here, to protect the ecological system, and to reduce flood and drought disasters, it is recommended that basinwide soil and water conservation organizations be established to coordinate development of comprehensive control work by relevant agricultural, forestry, water conservancy, and animal husbandry sectors so as to build the mountain regions of southern Shaanxi into economically flourishing new mountain areas.

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METHODS TO CONTROL FLOODING, CONSERVE WATER URGED

Beijing ZHONGGUO SHUILI [WATER CONSERVANCY IN CHINA] in Chinese No 3, 1982 pp 14-15

[Article: "Conscientiously Generalize Experiences and Lessons in Excelling in Future Water Conservancy Work"

[Text] Editor's note: In August 1981, a historic high-water-mark flood erupted in Hanzhong Prefecture and Baoji Municipality of Shaanxi Province, inflicting heavy damage. The hydroelectric bureau of the province organized flood investigation teams for on-site inspection and investigation in key damage areas to generalize experiences and to analyze the causes of these disastrous floods. The findings show the main feature of the disaster was excessive rains, causing three flood diasters: sliding slopes, mud flow, and rock slides. The basic causes of the disaster were high-pressure ridges of warm moist air over the Pacific Ocean, frequent typhoons, intensive sunspot activity, and abnormal weather. This caused long persistent heavy rains to spread over wide areas of Hanzhong and Baoji, causing rivers to overflow and inflicting disaster. There were many factors causing the floods: the direct cause was the heavy, prolonged rain. Also contributing to the flooding was the geography and history plus problems in governmental functions--less than ideal urban planning, unsound layout in industry, agriculture, commerce and communications; mismanagement in dike construction, and damages to forest and plant cover. The investigative report analyzed the situation. The following is an abbreviated report (Part III) quoted here for readers' reference.

Viewpoints and Opinions to Several Existing Problems:

I. Relationship Between Forest and Flood

Forests provide many benefits, such as moderating the climate, preservation of watersheds, soil and water retention, prevention of wind damage, keeping the sand compact, environmental beautification, and removal of pollutants. There are positive effects from regulating river and steam flow, reducing silt

silt deposit onto river channels and water reservoirs, and extending the service life of construction projects. This is why forests are called "dispatch rooms of mother nature" and "green water reservoirs." However, forests play a conditional and limited role in water storage and soil retention; the forests' role is diminishing with increased rainfall intensity. In addition, the role is closely related to terrain, geomorphology, and geological structure. In case of heavy rainstorms during the flood season, forests cannot effectively store flood water. It has been proved that forests fail to control floods.

At 4 o'clock in the afternoon on 22 August, the peak flood flow in the Han River passing Hanzhong Municipality was 8,310 cubic meters per second; the main source of the flood peak was the Bao River. At the Madao Hydrometric Station on the Bao River, the peak flood flow on 21 August was 5,810 cubic meters per second. At 13:43 hours on 22 August, the drainage flow at the gate outlet of the Shimen Water Reservoir was 4,830 cubic meters per second, which is 58 percent of 8,310 cubic meters per second at Hanzhong Municipality Hydrometric Station on the Han River. The plant-cover conditions of this valley are as follows: 77.8 percent of Taibai County in the upper reaches of the Bao River Valley (3,861 square kilometers), and 58.8 percent for Liuba County; forest plant cover for the entire valley is about 60 percent. Forest plant cover can be said to be relatively good. The Madao Hydrometric Station is situated on the down-river side of the middle streams of the Bao River, 28 kilometers from the Shimen Water Reservoir; the hydrometric station controls 3,415 square kilometers of the valley. There were low amounts of precipitation before 9 August; at the time, the soil moisture (in valley soil) was 17.2 mm. On 9 August, there was 54.7 mm of rainfall; the peak flood flow was 292 cubic meters per second, corresponding to a flow of 27.3 million cubic meters; the data were converted to 8.0 mm of net rain and a drainage coefficient of 0.15. There was no rain from 10 to 12 August. On 13 August, here was 2.8 mm of rainfall, and the soil moisture content in valley soil was 46 mm. On 14 August, there was 25.5 mm of precipitation, and the soil moisture content in valley soil was 62.4 mm. From 14 to 20 August, total precipitation was 348.2 mm, with four flood peaks (more than 1,000 to 3,000 cubic meters per second), corresponding to a flow of 298.6 million cubic meters; the data were converted to a net rainfall of 87.4 mm and the drainage coefficient was increased to 0.94. These data indicate that 85 percent of the precipitation (before 9 August) was accounted for by forest retention, downward seepage, filling of depressions, and evaporation because the climate in this period was relatively dry. However, in the later period after long persistent rainstorms, valley soil reached a saturation point and the total of the four aforementioned categories accounted for only 6 percent of precipitation. These data indicate that the forests' role of flood retention and storage was limited in the situation of persistent rainstorms in August 1981. We must point out that forests have a definite effect on the retention of ordinary rainstorm water, as well as on lessening disastrous floods; under certain environmental conditions, forests can exercise a remarkable role. We must stress, however, that in the area of Qinling and Bashan Mountains, the soil depths were thin; plant cover had been damaged; and soil and water losses were intensified. These are danger signs. We believe that it is necessary to protect closely the existing forest resources, to forbid opening up virgin land by wiping out forests, to add to forested area, to increase the percentage of plant cover, and to prevent water and soil losses en bloc.

II. Opinions on Constructing Dikes Along Medium-sized and Small River Channels

In recent years, regulations on medium-sized and small river channels were promulgated in provinces of China; many dike and river protection projects were completed. However, many problems still remain in our planning, design, construction and management, as this flood indicated. We should conscientiously generalize these experiences and draw lessons from them.

The four following problems need to be noted during planning: (1) Economic benefits should be stressed by conducting studies on necessity and feasibility. (2) Appropriate standards and guidelines should be complied with by adopting an adequate flood-prevention standard and by calculating the flood peak flows used to prevent the disaster. (3) During calculations of water flow cross-sections, we must take into account related conditions of water and sand, stable gradient, and river feature adequately to select dike distance and height, not too high and not too narrow. (4) Deal with all problems in river regulation and the relationship between left and right banks, as well as between upper and lower streams. Spur dike projects should not be so built as to form water barriers, with water overflowing into adjacent areas.

There are six problems in design and construction as follows: (1) If two flood prevention standards are used in a river sector (as in the case of different standards in urban area protection and in farmland protection), lattice dikes should be built at the sites of upper streams to protect the area from water flowing in by rear detours. (2) Erosion depths of river channels should be calculated in designing adequate foundations. (3) In river sectors with ready access to soil when the dike body is stable but difficulties exist in digging deep foundations, lead-wire cages or soft material protection (such as bundled bamboo baskets) can be used on bank slopes facing the water; stone masonry (not mortar rubble masonry) can be used to protect bank slopes facing the onrushing water. (4) In the case of a dike project with sector-by-sector design and construction, two ends of the project in the upper and lower streams should be joined to solid reliable locations such as high rocky pits or strong buildings to stop water flooding from the rear. (5) Dike fills should meet strict quality standards and bank slope projects should be constructed by strictly adhering to established design. (6) Reinforce the protection design at confluences of tributaries entering the main channel, and the water onrushing sector at bends of rivers.

In management, sound organizations should be established to improve the situation of river channel mismanagement. We should ban activities which damage dikes or empty waste materials into channels. Routine maintenance and repair work should be performed conscientiously.

III. Build Regulating Reservoir Projects as Per Plans

Up to the end of 1980, in the Hanzhong Prefecture and Baoji Municipality 2 large reservoirs, 10 medium-sized reservoirs, and 486 small reservoirs had been built with a total water capacity of 1,133,000,000 cubic meters. In this near-record-setting rainstorm and flooding, only two small (category II) reservoirs in Baoji Municipality collapsed; most water conservancy facilities stood the

test of flood, especially in the Hanzhong Prefecture, not a single dam failed. This was a success story in reservoir construction. In the flood period, these reservoirs of all sizes had some success in flood retention and protection. The combined effect of Fengjiashan and Wangjiayai reservoirs on the Qian River, as well as the incomplete Shitou River reservoir reduced the flood peak by 1,980 cubic meters per second at Weijiabao Station on the Wei River. In the case of Shimen Reservoir, it stored 30 million cubic meters of flood water and lowered the flood peak by 1,550 cubic meters per second to protect Hanzhong Municipality in relieving the flood diaster. Another case, that of the Duanjiaxia Reservoir in the upper reaches of the Qian River, the peak flood of the river channel was lowered from 436 to 36 cubic meters per second in protecting the county seat of Longxian. These examples are sufficient to illustrate the role of water reservoirs in flood prevention and flood peak reduction during the struggle against this kind of disaster. However, the reservoir capacity is too small compared to the onrushing river flow, so the flood eventually gained the upper hand. Therefore, we suggest planning regulation projects, when economically feasible, of the Zhouzhihe River reservoir, Jiebaiquan and Qingqiaopu reservoirs on the Bao River, and the Jiaoyai Reservoir at Chenggu to protect Xianyang County, Xi'an Municipality, Hanzhong Municipality, and Chenggu County in order to exploit the comprehensive benefits of flood prevention, irrigation, power generation, and water supply.

IV. Urban Planning and Plant Deployment Should Be Coordinated With Flood Prevention Projects

During plant and warehouse site selection and deployment of the commercial distribution network, some organizations pay attention only to immediate benefits but neglect the overall benefits gained and damage eliminated by the river channel requirements. As a result, some avoidable damage has been inflicted. In the future, urban planning and plant deployment should give due attention to the requirements of flood prevention and should be closely coordinated with flood prevention programs in urban areas. In addition, procedures of capital construction should be adhered to; geological prospecting should be done in advance and proper measures for prevention should be adopted in order to reduce damages caused by descending slopes, landslides, mud flows, and rock slides.

From the above-mentioned, we stress in particular adhering to routes with comprehensive regulation. On one hand, we should strictly protect existing forest resources by forbidding the opening of virgin land by wiping out forests; we should also vigorously engage in tree planting and linking up forests in order to increase the ratio of forest cover and water and soil retention. On the other hand, we should build necessary dike projects along the banks of the Pingchuan sector of the Han River and in the middle and upper streams of Wei River to coordinate planning and meet local conditions. Maintenance and management of existing dikes should be strengthened to clear out barriers to flood passage in river channels. In the planning of urban development, we should give due heed to flood prevention requirements, and the effects of descending slopes, landslides, mud flows, and rock slides for a rational layout. Some essential regulating water reservoirs should be built along principal tributaries. Our activity in the future should be directed to these above-mentioned areas.

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BENEFITS OF MARGINAL ANALYSIS OF COSTS, OUTPUT EXPLAINED

Beijing ZHONGGUO NONGKEN [STATE FARMS & LAND RECLAMATION IN CHINA] in Chinese No 8, 82 pp 12-13

[Article: "Application of Marginal Analysis to Improvement of Economic Effectiveness"]

[Text] A major indicator of how good a job is being done in agricultural production on state-owned farms is fairly high economic effectiveness. We conducted a survey and analysis of wheat production costs and economic effectiveness for a number of eyars at the Wusi Farm in Shandong Province, which showed that despite steadily increasing wheat output and profits, nevertheless the farm had some problems meriting attention. Let us first detail the survey and analysis circumstances below.

1. Changed Circumstances in Wheat Production Costs and Economic Effectiveness

The Wusi Farm has 4,200 mu of cultivated land, about 3,200 mu or more than 70 percent of which was sown to wheat every year. The farm made profits totaling 447,100 yuan from the growing of wheat from its first profits in 1975 until 1981, its annual profits averaging 19.95 yuan per mu, and its cost profit rate being 41.2 percent for fairly high economic effectiveness. Beginning with cost analysis, we analyzed wheat's economic effectiveness, the changes in development being shown in Table 1.

Table 1. Wheat Output and Cost Situation Over the Years

Year / Item	1974	1975	1976	1977	1978	1979	1980	1981
Yields per mu (jin)	336	407	387	347	330	558	415	402
Cost per mu (yuan)	27.00	29.15	33.00	32.15	34.15	50.00	52.30	58.22
Cost per jin (yuan)	0.080	0.072	0.085	0.093	0.104	0.054	0.126	0.145

In the 8 year period between 1974 and 1981, wheat yields went from 336 jin per mu to 402 jin per mu for a 19.6 percent increase, while costs rose from 27 yuan per mu to 58.22 percent for a 1.16 fold increase. Though wheat output rose greatly, owing to the higher cost per mu, the per unit cost also rose greatly. Wheat costs rose from 0.08 yuan to 0.145 yuan per jin for an 81.3 percent increase.

A look at the foregoing situation shows a steady increase in the cost per mu of wheat. This reflected the farm's movement from extensive to intensive operations. This movement did not develop evenly. In the 5 year period between 1974 and 1978, wheat costs per mu rose fairly slightly. This period reflected adherence to an attitude of circumspection toward costs, and attention to pursuit of economic results from costs in consequence of which per unit costs were fairly stable and economic effectiveness was fairly high. Between 1978 and 1979 a great leap in costs appeared. Costs rose suddenly from 34.15 yuan to 50 yuan per mu, a 46.4 percent increase, while wheat yields increased from 330 to 558 jin per mu, a 69.1 percent increase. Because the extent of increase in output exceeded the extent of increase in costs, costs of product fell from 0.14 yuan to 0.054 yuan per unit of area, a decline by half for the lowest product cost and optimum economic results in many years. Plans called for continued lowering of costs and higher output for greater economic effectiveness between 1979 and 1981. However, this hope was greater than the farm's realities permitted, and the anticipated goals were not obtained, with the result that economic results declined greatly. In 1981 costs of wheat production rose to 58.22 yuan per mu, a rise of 16.4 percent while yields fell to 402 jin per mu, a decline of 28 percent, occasioning an increase in costs of 0.145 yuan per jin or a 68.7 percent rise.

2. Analysis of Marginal Effectiveness of Costs

In an overall sense the economic efficiency of Wusi Farm's wheat production was rather good. However, marginal analysis of economic benefits derived from increased costs year by year shows numerous conspicuous problems. Supposing: costs per mu to be x and yields per mu to be y, the average benefits being y/x; amount of increase in costs per mu being Δx, and amount of increase in yields per mu being Δy, the marginal yields from production costs thus being $\Delta y/\Delta x$; if the per unit price per jin of wheat is py (the prevailing price being 0.167), the marginal benefit from production costs would be $\Delta y.py/\Delta x$. Our analysis of marginal benefits as derived from survey data are shown in Table 2.

It may be seen from analysis of Table 2 that marginal effectiveness was greatest in 1975 and 1977. This was because during these two years $\Delta x < \Delta y.py$. After 1977, continued major increases in production costs brought a decline in marginal effectiveness, and 3 of the 4 years showed a negative value, i.e. $\Delta x < \Delta y.py$. Despite the all-time high yields of 558 jin per mu in 1979, marginal effectiveness was less than one-third that of 1977. The foregoing analysis shows that application of marginal analytical methods to determine optimum economic results is extremely important.

Table 2

(1) 年度	亩成本 (元) x (2)	(3) 亩收益 亩产 y (斤) (4)	亩收入 (元) (5)	亩成本增加额 Δx (元) (6)	亩产量增加量 Δy (斤) (7)	亩收入增加额 Δy·py (元) (8)	平均收益 (元) 3/1 (9)	边际收益 (元) 6/4 (10)
	1	2	3	4	5	6	7	8
1974	27.00	336	56.07				2.08	
1975	29.15	407	67.97	2.15	71	11.86	2.33	5.52
1976	32.15	347	57.95	3.00	-60	-9.62	1.80	-3.20
1977	33.00	387	64.63	0.85	40	6.68	1.96	7.86
1978	34.15	330	55.11	1.15	-57	-9.52	1.61	-8.28
1979	50.00	558	93.19	15.85	228	38.08	1.86	2.40
1980	52.30	415	69.31	2.30	-143	-23.85	1.32	-10.38
1981	58.22	402	70.14	5.92	-13	-2.17	1.22	-0.37

Key:

(1) Year
(2) Cost per mu (yuan) x
(3) Benefits per mu
(4) Yield per mu (jin) y
(5) Income per mu (yuan)
(6) Increased cost per mu (yuan) Δx
(7) Increased yield per mu (jin) Δy
(8) Increased income per mu (yuan) $\Delta y,py$
(9) Average net benefit (yuan) 3/1
(10) Marginal benefit (yuan) 6/4

3. Analysis of Cost Structure

In an overall sense, analysis of marginal effectiveness of costs reflects the contrasting relationship between added costs and increased income. But a very large number of items make up costs in agricultural production, so what is the major area in which economic effectiveness can be improved? It is also necessary to make a specific analysis of the structure of costs. There are 10 different items making up the cost of wheat production. Those accounting for the greatest proportion and changing fairly greatly are shown in Table 3 (averaging expenditures per mu).

Among the three cost items shown in Table 3, the ratio of total costs is greatest for fertilizer and pesticides (mostly fertilizer), and during the 8 year period from 1974 to 1978, they accounted for more than 40 percent of total costs. The extent of increase in fertilizer expenses was very great, increasing from 12.76 yuan per mu in 1974 to 23.09 yuan per mu in 1981, or almost double. However, a look at the increase in yields resulting from fertilization shows yield increases to have been vastly lower than the increase in fertilizer expenses. This brings a problem into sharp relief. For future increases in the amount of fertilization, the optimum value of marginal output derived should be used as a yardstick for measuring the additional amount of fertilization. Only in this way can one derive optimum economic effectiveness.

Table 3

Item \ Year	1974	1975	1976	1977	1978	1979	1980	1981
Fertilizer and Pesticide	12.76	7.39	13.51	12.33	16.27	16.07	16.39	23.09
Machine Operation Expenses	4.63	4.85	4.15	5.20	2.77	9.15	11.53	12.12
Indirect Expenses	3.83	10.91	8.10	5.48	7.72	10.63	21.41	9.92

Note: Indirect expenses included enterprise management expenses and joint production expenses.

Expenses for machine operations also accounted for a substantial proportion of the cost structure. Up until 1979 it accounted for from 16 to 18 percent of total costs; after 1980, it increased to more than 20 percent. It went from somewhat more than 4.00 yuan per mu to somewhat more than 12 yuan per mu, a threefold increase. Costs for machine operations are fairly stable for the growing of wheat. The need to create soil moisture as a result of the drought of the past several years slightly increased the amount of work, and the increase in machine operation expenses was occassioned principally by poor maintenance and care, which created an increase in costs per standard mu. Future attention to maintenance and care of machines for a lowering of machine operation expenses is a major way in which to increase economic effectiveness.

The fairly numerous indirect expenses are a major element adversely affecting economic effectiveness. During the past several years both enterprise management expenses and joint production expenses have risen tremendously. They rose from an average 3.83 yuan per mu in 1974 to about 10.00 yuan per mu, an almost threefold increase accounting for 20 percent of total costs. Rise in indirect expenses increased both costs per unit of area and costs per unit of product. The relationship between indirect expenses and direct technical measures in production is not great, so vigorous efforts at conservation should be made in future to the maximum extent possible.

4. Strengthening of Economic Management In Order to Increase Economic Effectiveness

All production on state-owned farms should have as its fundamental point of departure increase in economic effectiveness. This requires that the farms strengthen economic management, and operate on the basis of economic laws and natural laws. Economic management should serve to increase economic effectiveness.

Management of costs is a major ingredient in the economic management of farms. Application of complete cost accounting data to analyze dynamic trends and to analyze static structure can forecast the direction of added costs, determine the appropriateness of costs, and gain the optimum obtainable economic effectiveness. Agricultural product production costs reflect the degree of inten-

siveness of agricultural production. The object of cost management is not to shrink costs passively, but rather should be to actively add to costs to gain the highest degree of improvement in economic effectiveness, i.e. when the value of increased output is greater than added costs to add to costs. The task of cost management is to find this optimum degree of intensivity.

Use of marginal analytical methods to conduct marginal analysis of costs and their economic effectiveness makes it possible to see clearly at any stage the economic results of added costs, thereby being able to select the amount of cost investment that will derive optimum economic effectiveness. When the objective conditions for increasing costs are not present, one should not blindly increase costs. Our research and dissemination in this regard is currently still very insufficient and urgently requires strengthening.

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EFFORTS TO CONTROL EROSION UNDERWAY

Beijing ZHONGGUO NONGMIN BAO in Chinese 19 Aug 82 p 1

[Article: Luliang Prefecture Hastens Pace of Water and Soil Conservation Work; Genuinely Strengthens Leadership and Promotes Advanced Experiences"]

[Text] Since the Third Plenary Session [of the 11th Party Central Committee], Luliang Prefecture in Shanxi Province has genuinely strengthened leadership, has summarized and spread experiences, and has hastened the pace of water and soil conservancy work.

Since the founding of the People's Republic, Luliang Prefecture has brought erosin under control over a 6.41 million my area, or 35.6 percent of its total land area. Following the Third Plenary Session, the party's rural policies stimulated the enthusiasm of the broad masses of people, and between 1979 and 1981, 450,000 mu was brought under control annually. This amounted to 2.5 percent of the total soil erosion area and was 157 percent faster than during the previous 29 years.

In order to strengthen leadership of water and soil conservation work, the prefecture's government administrative offices established a soil and water conservation bureau, which annually convened two conferences on soil and water conservation to summarize and spread experiences and to formulate overall programs for farming, forestry, and animal husbandry in which forestry predominated, and put forward the "two soil method." By this was meant the division of existing cultivated land into two kinds. One kind of soil was for development of grain and oil-bearing crops primarily to solve the problem of food for the masses. The other soil was premarily for development of economic forests to solve the problem of the masses spending money. This specifically provided for the "building of land, the planting of trees, the growing of grass, attention to livestock, interception of water, and the building of roads." Methods of control used three combinations: 1. a combination of botanical measures and engineering measures, attention going first to botanical measures; 2. a combination of control of ravines and control of slopes, attention going first to control of slopes; and 3. a combination of control of the upper and control of the lower, attention going first to controlling the upper. Throughout the prefecture numerous good representative cases occurred. One was in

Zhongtanggou Production Brigade in Fangshan County where between 1973 and last year a total of 1,030 meters of river dams were built, 560 mu of river shallows brought under control with benefits already accruing from 400 mu, and the gradual return to forests and pasturage of cultivated slope land. The cultivated area has declined from the former 3,100 mu to 1,500 mu; total grain output has increased from the former 130,000 jin to 328,000 jin, and a change has taken place from the eating of 30,000 jin of grain resold by the state to the sale of 50,000 jin to the state. Following the withdrawal of land from cultivation for return to forests, active afforestation and planting of grass was done. The amount of woodlands averaged 8.5 mu per person in the brigade, and the amount of grassland 1 mu. The livestock industry saw commensurate development. Now this prefecture is actively adopting measures to bring to a halt the situation in some areas of clearing steep slopes and destruction of forests to clear land. In serious cases, it is meting out punishments to fairly good effect.

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TITLE: "An Experiment in Numerical Forecasting of Typhoon Tracks With Nested Models"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 3, Aug 82 pp 257-270

TEXT OF ENGLISH ABSTRACT: In order to improve the prognosis of typhoon movement, the nested mesh schemes for the primitive equation models are presented in this paper. An experiment on prediction for some examples had been made by using these schemes. It is shown from the calculation that the methods for conjunction and adjustment of dependent variables at the juncture of coarse-mesh and fine-mesh are effective and the axial-symmetrical typhoon circulation simulated by the normal distribution is suitable for the prediction of typhoon movement by using numerical models. One of the schemes was tested during the typhoon season in 1980 and resulted in the improvement, to a certain degree, in the forecast of the typhoon tracks. This paper was received for publication on 12 December 80.

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TITLE: "An energetic Analysis of A Landed Typhoon"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 3, Aug 82 pp 289-299

TEXT OF ENGLISH ABSTRACT: The case selected in this study is an intense typhoon (Billie) which moved over the Southeast China and interacted with an extratropical frontal system. Kinetic energy (KE) budget and available potential energy (APE) were computed by using the quasi-lagrangian scheme during the period of 10-12 Aug 1976. The main results of this study are: (1) In the weakening process of the landed typhoon, exchange of KE with the environment was small. Then, the typhoon could be considered as a "quasi-closed" system. (2) In the various weakening stages of the landed typhoon, the thermodynamic and dynamic processes were different. When the typhoon moved just over land and accompanied with heavy rain, the latent heat and moist convection were still the major source of KE. The energy sink due to cross-contour flow in the upper troposphere was the important reason for the decrepitude of the typhoon. The barotropic process was dominant in the decrease of KE. However, after the typhoon interacted with the westerlies, the KE generation by

[continuation of QIXIANG XUEBAO No 3, 1982 pp 289-299]

baroclinic process increased and the frictional dissipation played a significant role in this stage; (3) Throughout the period of interest, large amount of APE entered into the environmental atmosphere through the lateral boundaries of the typhoon circulation. This may be one of the major processes of interaction between the typhoon and the surroundings.
This paper was received for publication on 10 Dec 80.

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TITLE: "The Constant Energy Tubes of a Landing Typhoon"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 3, Aug 82 pp 300-309

TEXT OF ENGLISH ABSTRACT: In this paper, based on isentropic relative-flow analysis, it is found that there are constant energy tubes in typhoon. These constant energy tubes appear also in the severe rainstorms produced by other synoptic systems, such as the vortices in Southwestern China and warm shear line. It is pointed out that these constant energy tubes play an important role in the summer energy balance of the atmospheric general circulation.
This paper was received for publication on 18 Mar 81.

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TITLE: "Moisture, Sensible Heat, and Kinetic Energy Budgets During the Heavy Rainfall"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 3, Aug 82 pp 310-318

TEXT OF ENGLISH ABSTRACT: In this paper the kinetic energy, sensible and latent heat budgets over limited area are calculated during the heavy rainfall in July 1977. In the heavy rainfall system sensible and latent heat, supplied from surroundings, are converted into kinetic energy, which is transported out of the area at upper levels by horizontal flux divergence. Subgrid-scale motion leads to increase of sensible heat and decrease of latent heat of the grid scales of motion. Transfer of kinetic energy from subgrid to grid scales of motion is observed in the area with most intense rainfall, but an opposite transfer occurs in its surroundings. Some results of this paper are useful for designing numerical models of precipitation.
This paper was received for publication on 20 Apr 81.

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TITLE: "Ultra Low-level Jets and the Heavy Rain in Early Summer Over South China"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 3, Aug 82 pp 319-326

TEXT OF ENGLISH ABSTRACT: In this paper, the eight cases of heavy rain over South China are analyzed. It shows that the process of the heavy rain associated with the 102 ultra low-level jets--southerly jets of sub-synoptic scale at low-level in boundary layer. It is a significant factor of heavy rain in early summer over South China.
This paper was received for publication on 13 Jul 81.

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TITLE: "On the Light and Thermal Resources and the Crop Potential Productivity--Taking Luancheng County of Hebei Province as an Example"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 3, Aug 82 pp 327-334

TEXT OF ENGLISH ABSTRACT: The process of photosynthetic production of crop is divided into three steps for analy ing their limiting factor and photosynthetic efficiency. On this basis, the parameters are determined and a calculation scheme is established; meanwhile the temperature correction being made. Taking Luancheng as an example, the potential productivities of wheat, maize, rice, and for different cropping system have been investigated. Finally, some measures for increasing the potential productivity and the efficiency of utilization of light and heat are discussed.
This paper was received for publication on 10 Jul 81.

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TITLE: "Wind Regime Beneath Crop Canopies and Its Model"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 3, Aug 82 pp 335-343

TEXT OF ENGLISH ABSTRACT: The characteristic features of horizontal and vertical wind-speed distribution beneath crop canopy are discussed. It is found that there exists an assymmetric "S" pattern vertical profile. Deficiency of commonly used models of horizontal and vertical profiles inside crops is also analyzed. A new model describing wind speed inside crops is proposed on basis of theoretical analysis and empirical fitting. According to this new model the computed mean wind speed, whether in horizontal distribution or along vertical profile, is in fairly good conformity with the real data.
This paper was received for publication on 19 Oct 81.

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TITLE: "Some Microclimatic Effects of Reclamation"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 3, Aug 82 pp 353-360, 326

TEXT OF ENGLISH ABSTRACT: In this paper, the field observation data of cultivated and uncultivated land at Hulunbeier for two years in succession are used. The authors analyzed the variations of soil hydrothermal condition, atmospheric dynamic and thermodynamic condition near the ground, and surface heat balances during the period between spring and summer (May-June)after reclamation. It is indicated that the microclimatic effects of reclamation are many sided and obvious, especially, the thermodynamic effects. So, one must pay attention to the influences of such human activities as reclamation on climatic conditions.
This paper was received for publication on 8 Sep 81.

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TITLE: "A Criterion of Autumn Rain Forecast in Shanghai"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 3, Aug 82 pp 361-365

ABSTRACT: Based upon the autumn rain and related data of Shanghai of the period 1874-1979, a graph is made to depict the average rainfall of 10-day periods of every month in these 106 years. The graph demonstrates clearly that just like the plum rains in the spring, the autumn rains in Shanghai are concentrated in a rainy season, from late Aug to middle Sep. The amount of rain in that period has a great effect on the yield of cotton. Surveys indicate that rains heavier than 210 mm may cause a 30 percent yield reduction of cotton. Following descriptions of the atmospheric circulation pattern and the weather characteristic of that period, the paper concludes that the beginning, continuation, and conclusion of autumn rains are the results of the 2 great adjustments of long wave trough and ridge of the westerlies and following the each of the 2 adjustments, the secondary high declines and receded. Finally, a correlation between the average intensity of the secondary high at 500 mb in Aug and the subsequent autumn rainfall is discovered. The average intensity of the secondary high in Aug is used as a criterion to check the amount of rainfall in Sep of 1979 and 80. The results correspond very well with the reality.
This paper was received for publication on 18 Feb 81.

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TITLE: "Estimation of Artificial Rainfall Effect"

SOURCE: Beijing QIXIANG XUEBAO [ACTA METEOROLOGICA SINICA] in Chinese No 3, Aug 82 pp 381-385

ABSTRACT: With reference to the quantitative estimate equation suggested by Simpson et al in the JOURNAL OF ATMOSPHERIC SCIENCE (Vol 30, 1973 pp 1178-1190), the paper demonstrates mathematically that a certain deviation exists in the estimation using that equation. Effect of an artificial rainfall test in Hebei Province using urea as the catalyst is analyzed with the equation of Simpson as well as the method proposed by the author in the paper. With Simpson's technique, the relative increase of rainfall is 33.5 percent; with the author's technique, it is 49.3 percent. The difference remains apparent.
This paper was received for publication on 29 Jun 81.

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TITLE: "Survey Report of Fava Bean [Broad Bean] Production in Jingzhou Prefecture"

SOURCE: Wuhan HUBEI NONGYE KEXUE [HUBEI AGRICULTURAL SCIENCES] in Chinese No 9, Sep 82 pp 8-11

ABSTRACT: A survey of broad bean production in Jingzhou Prefecture was carried out in 11-20 May this year jointly by the Cropping System Research Conference, the Grain Crop Society, Plant Protection Society of Hubei Provincial Society of Agriculture, the Jingzhou Prefecture Society of Agriculture, and the Jingzhou Prefecture Bureau of Agriculture, and the leaders and specialists of several local bureaus of agriculture. In 1953, broad bean was a summer crop in the prefecture for adjusting soil fertility, having an acreage of 2.23 million mu and a yield of 127 jin/mu. The low temperature in 1956 led to severe reduction of yield and the leaders of that time ideologically emphasized the production of major food grains to result in gradual decrease of the acreage of broad beans. It was down to 882 thousand mu in 1980. Since then, the leaders of various levels have noticed that excessive continuous cropping of wheat and cotton has caused serious damage to soil fertility. A series of measures have been adopted to introduce superior breeds of broad beans, to extend its high yield technology, and to organize teams to learn from regions outside the prefecture. In 1982, the acreage was restored to 996 thousand mu and an average

[continuation of HUBEI NONGYE KEXUE No 9, 1982 pp 8-11]

yield of 189 jin/mu was obtained. The yield was especially high in some commune-brigades of rice paddy areas, reaching 300-500 jin/mu. Aside from the acreage and the condition of production of 17 brigades of 15 communes of 9 counties of the prefecture, the paper also reports the result of using broad bean crop before cotton to promote the yield of cotton and the result of using broad been in rice paddies to raise the crop-repeating index. Key techniques for obtaining high and stable yield of braad bean are also suggested.

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TITLE: "Research on Winter Prospering Rape"

SOURCE: Wuhan HUBEI NONGYE KEXUE [HUBEI AGRICULTURAL SCIENCES] in Chinese No 9, Sep 82 pp 15-17

ABSTRACT: Using the form of growth of rape plant in winter (before Little-cold = 6 Jan] as the standard, if there are 5-6 green leaves, with a leaf area coefficient < 0.5 and a dry weight of plants < 100 jin/mu, it is called winter-holding rape; if there are 7-8 leaves, with a leaf area coefficient of about 0.8 and a dry weight of about 150 jin/mu, it is called winter-vigor rape; if there are 9-10 leaves, with a leaf area coefficient above 1.2-1.5 and a dry weight of above 200 jin/mu, it is called winter-prospering rape. There is a close relationship between this form of growth and the subsequent yield. The yield of the winter-prospering type of rapeseed is 89.4 jin/mu higher than the winter-vigor type, an increase of 39.6 percent, and 158.9 jin/mu higher than the winter-holding type, an increase of 101.7 percent. Results of an experiment in 1978-80 also indicate that the better is the winter-prospering form, the higher is the yield. The spring growth phenomenon and the physiological characteristics of winter-prospering rape crops and the relationship between the quality of growth in the winter and the subsequent yield are explained. The environmental conditions necessary for obtaining winter-prospering rape in the middle reaches of Changjiang, including various experimental data, are introduced.

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